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CHINA REPORT

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BRIEFS

TELECOMMUNICATIONS IMPROVEMENTS--The Ministry of Posts and Telecommunications recently held a telephone conference, calling for efforts to improve quality in the field of telecommunications, combat corruption and theft, and insure safety in operation. Cheng Anyu, vice minister of posts and telecommunications, spoke at the conference, urging all units concerned to improve telecommunications and expedite mail delivery. [OW281707 Beijing Domestic Service in Mandarin 0400 GMT 28 Sep 80 OW]

CSO: 4008

PHYSICAL SCIENCES

HIGH ENERGY EXPERIMENTS SEEN AS KEY TO DEVELOPING HIGH ENERGY PHYSICS

Beijing ZIRAN BIANZHENGFA TONGXUN [NEWSLETTER OF DIALECTICS OF NATURE]
in Chinese No 3 Jul 79 pp 67-77

[Article by Wang Zhuxiang [3769 4376 5046]: "The Function of High Energy Experiments in the Development of High Energy Physics"]

[Excerpts] High energy physics is a science that studies the properties of basic particles, their inner structure, and the patterns of mutual reaction and conversion. At present, high energy physics has already developed greatly. In the development of high energy physics, experimentation has always played the leading role. This article is aimed at emphasizing several major problems in the development of high energy physics to explain the dependent relationship between theory and experimentation and the leading role played by experimentation. It also points out the importance of high energy experimental physics and the difficulties and complexity of modern day high energy experiments. Finally it proposes some views on how to prepare for high energy experiments and future prospects.

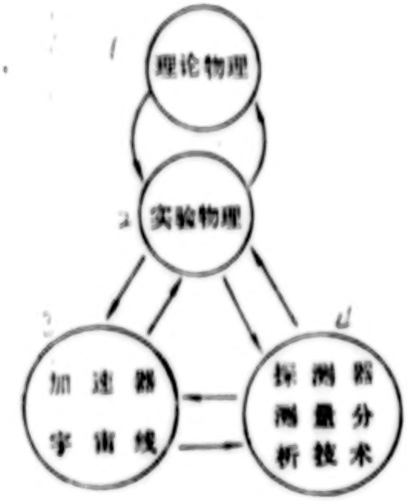
Experimental Achievements Are the Signposts of Advanced Levels

We can conclude here that high energy experiments always play the leading role in the development of high energy physics and are a decisive function. They are the most active and the richest in creativity in the entire field of high energy physics. They are the central link in the development of high energy physics. If a nation's experiments in high energy physics take the lead internationally, then its theory will also be in the leading position, and thus the entire field of high energy physics will be in the lead. Conversely, if its experiments are backward, then its theory will not be advanced and even if it can build very good accelerators, the entire field of high energy physics will still be backward.

In connection with this point, let us take a look at the relationship among theoretical physics, experimental physics, accelerators and probes (including data analysis and processing equipment). Comrade Peng Huanwu [1756 2719 2976] once explained the relationship among the four aspects above by drawing a symbolic illustration. He believes that experimental physics is the heart of the entire field of high energy physics. He points out that to engage in experimental physics, one cannot be without an accelerator and a probe and one cannot be without the guidance of theoretical physics. But experimental physics is the center of these four aspects. This viewpoint is correct because theory without experimentation as foundation will have no basis and will not develop. In the same way, even if one has an accelerator but the probe is not as advanced and experiments cannot be carried out or even if one has an accelerator and a probe but because the preparation for experiments is not done well and good experiments cannot be carried out, then all of these will render the building of an accelerator ineffective.

Therefore, in the development of high energy physics, experimental physics is situated at a key position. It is very important and can never be neglected even slightly. It should be especially noted that high quality achievements in experimental physics and the presence of high caliber talent conducting these experiments are the true signposts that indicate the internationally advanced levels have been reached.

Here, we will present one example as contrast and for explanation. In 1960, the Brookhaven National Laboratory (BNL) of the United States built a 33GeV proton accelerator. For more than 10 years, attention by the leadership and joint efforts by experimental physicists and technical personnel enabled high quality probing facilities and scientific and technical personnel to be prepared early. Very outstanding achievements in physics were realized in this accelerator and great and important contributions were made to the development of high energy physics. For example, massive discovery of resonance states; proof of the existence of the second category neutrino; discovery of the Ω^- particle; discovery of nonconservation of CP during the decay of K_L^0 and the discovery of the J particle and such experiments can all be said to be key developments in physics. These achievements brought praise from the international scientific circles to BNL. It is believed that their level of achievement is the highest in the world. Conversely, the Soviet Union built a 10GeV proton accelerator in 1957. Except for the discovery of the $\tilde{\Sigma}^-$ antihyperon by our nation's Wang Ganchang [3769 3227 2490] group, there has not been other outstanding work in physics. In 1967, the Soviet Union again built a 76GeV proton accelerator. At the time, this was the world's largest accelerator but because advanced probing techniques were not grasped beforehand and experimental physicists were not prepared, important achievements were not realized for a long time in physics. Internationally it is unanimously believed that the Soviet Union is far behind the West in high energy physics. The above examples fully show that although the accelerator is a kind of tool that is indispensable in high energy experiments, but by itself it cannot represent the level of high energy experimentation. If a high energy experimental base realizes remarkable achievements and has reached the internationally advanced levels, then this mainly refers to the achievements in experimental physics. Yet this is indeed more difficult than building an accelerator and a more difficult task.



Key:

1. Theoretical physics
2. Experimental physics
3. Accelerator
   Cosmic rays
4. Probe
   Measurement and analysis techniques

The relationship among theory, experimentation, accelerator and probe

Preparation of the Work in Experimental Physics

Building a modern high energy accelerator of course is not an easy task. It is indeed very difficult and it should be forcefully grasped first. But, preparation of the work in experimental physics is also a very difficult task. According to the experience of high caliber laboratories abroad, the overall task of building various high quality and effective probes and measuring facilities and building an entire experimentation zone are even more difficult than building an accelerator. This is because they are varied and their scope is wide, their technology is more complex than the accelerator, the overall scale is larger than the accelerator, the overall cost surpasses the cost of building an accelerator, the building period is about the same as that of building an accelerator. Therefore, unified planning of a high energy experimental base must give sufficient attention to preparatory work in experimental physics and must be grasped immediately. Otherwise, experimental work will be delayed.

At present, how should preparatory work for experimentation and the probe be carried out? There are two views. One view believes that to begin experimentation 5 years from now, concrete subjects in physics must be selected now and then the various types of instruments and facilities are prepared according to the needs of the subjects. Preparation should be completed within 5 years and then experimentation can begin. Another view believes that if subjects in physics are chosen immediately, there will be great difficulties. This is because nobody has any practical experience and which questions are the most important cannot be envisioned. Even if the topics are chosen, it is very possible that they will have to be changed 5 years from now. If we wait until we can envision the right problems and after the subjects in physics are determined and then make preparations for the probe, then time will have already passed and by that time there will not be enough time to prepare the instruments. Because we do not have readily available probes and basic instruments, everything has to be developed by research, and the period for developing and building most of the equipment and facilities is at least 4 to 5 years; thus, it has been advocated that the subjects of study in physics should be neglected and probing facilities should be built first.

I believe both of the above views are right but they are not comprehensive. According to the ordinary situation of foreign laboratories, generally the topics in physics to be studied have indeed been established first and have been approved by the academic leadership of that institute before preparation for laboratory facilities begins, except for the general purpose probes such as the hydrogen bubble chamber, the multiple particle spectroscope, etc. This is very easily accomplished by laboratories which have massive numbers of ordinary equipment, massive numbers of basic installations and massive numbers of probes. This is because not too much time has to be spent on determing the subject, proposing the problem and preparing for the experiment. All these can be done in half a year or at most 1 or 2 years. Most of the instruments are readily available. If they are not enough, they can be bought on the market immediately. Therefore the topics to be studied will not be outdated. But if the time between making the proposal of the topics for study and the actual time the experiment begins is too long, such as 4 or 5 years, then obviously the problem as to whether the selected topic is out-dated or not will emerge. On the other hand, if probing facilities are prepared first without regard to the topics in physics, then what kinds of probes and equipment should be developed, nobody would know. Therefore, considering our actual situation, I believe there should first be a general direction in the study of physics, and then preparations of basic and general purpose probes and facilities should start immediately. These probes and facilities are necessary for a high energy laboratory and are also those which will be needed by a majority of experiments, for example, the multiple streak proportion chamber, drift chamber, Cherenkov counter, flash counter, electronics instruments, general purpose magnet, hydrogen bubble chamber, time chamber,...etc. As the basic facilities and equipment are being developed, the subject of study in physics should be clarified gradually. After 1 or 2 years, our probing technique will have established a relatively solid foundation, and at the same time our ideas in physics will gradually become active. By that time, concrete topics of study can be determined, and experimental facilities and probes can be selected according to the topics.

Prospects of High Energy Experimental Physics

Since the birth of high energy physics, high energy experiments have already realized great achievements, and many important problems have been solved. Yet, man's understanding of nature is never complete, and as man's understanding deepens, there will be a lot of new questions that will be proposed and which will require experimentation to solve. Seen at the present time, the following problems urgently need to be solved.

1. Finding Quarks (or Stratons)

Since the quark model can better explain particle classification and certain patterns in strong action, weak action and electromagnetic action, predicting their existence is very rational. Therefore the search for quarks will be an important topic in future experiments. The search for quarks must be to find them singly and to measure their properties such as mass, charge and life. The major difficulty in searching for quarks is that their mass is large and the accelerators in the world at present still cannot separate them from protons. Experiments to search for quarks are not limited to the use of accelerators. Quarks can be found in cosmic rays or samples of earth's substances. But to find them, methods of much higher sensitivity must be used.

2. Finding new fundamental mutual reactions such as super-strong actions and extra-weak actions.

3. Finding the intermediate bosson W. One theory predicts that its mass is greater than 37GeV, another theory believes it is even greater.

4. Continuing the search for the heavy lepton, studying the spectrum of the lepton and its properties, exploring the internal structure of lepton itself and the relationship between leptons and intermediate bossons--transmitter of weak actions.

5. Conducting experiment with the neutrino by using high energy neutrino bundles to explore the inner structure of neutrons and even the structure of the lepton.

6. Finding other new particles, such as the chi-graviton, heavy photons, gluons, magnetic monopole particles and even heavier unknown families of particles.

7. Examining the applicability of quantum electrodynamics in even smaller areas (smaller than 10^{-16} centimeters). Whether these particles have any dimensions is related to their structure. These experiments require an electron-positron smasher of even higher energy.

According to past development, we can predict that in the coming 20 years, more new phenomena which we cannot foresee at present will emerge; therefore they will greatly enrich the content of high energy physics.

It must be emphasized and pointed out that to enable high energy physics to continue to develop, accelerators of even higher energy and probing techniques and experimental methods that are more sensitive and more effective are needed. Like the problems mentioned above, most of them cannot be solved by the presently available high energy accelerators. Therefore, the world's nations are now building and preparing to build accelerators of even higher energy. Positive and negative electron smashers scheduled for completion this year or next year are: West Germany's PETRA of an energy of ~2 × 20GeV and PEP of the United States with an energy of ~2 × 20GeV. They will contribute towards quantum electrodynamics within even smaller areas, the examination of the unified theory of electromagnetic forces and the weak force, and the search for particles of even greater mass. Recently the United States government approved the Brookhaven National Laboratory's ISABELL plan to build a 2 × 400 GeV proton smasher scheduled for completion in 1985. It can be expected that as this smasher-accelerator is completed, a majority of the questions mentioned above can be solved by experiments.

What kind of probes should we use to probe cases of reactions of such high energy particles? The presently available probing techniques cannot measure the properties of particles of very high energy because these probes cannot differentiate the speed and ionization of high energy particles and also they cannot accurately measure momentum. Multiply produced actions simply cannot be measured. Therefore, after the 2 × 400 GeV proton smasher of the United States is built, although the search for stratons and intermediate bosons is very hopeful, but during the experiment, a very difficult problem of an extremely large background will be encountered. How can the background be eliminated? Or, how can the probe be desensitized to the background and be sensitive only to those cases which are of interest? All of these are problems that have to be solved. It can thus be seen that as the energy of the accelerator increases, there must be corresponding improvements and development in probing techniques and experimental methods and even a new type of probe may have to be created. This point should definitely not be neglected, otherwise good experimental results cannot be obtained. It can be believed that as high energy experiments make their demands, this type of probing technique and experimental method will definitely emerge.

Looking back at the past development and looking at the future, we are full of confidence in the future of high energy physics. Construction for preliminary development and research of our nation's first high energy accelerator has already broken ground in Beijing. This signifies that our nation's high energy physics research has begun a new phase. This modern scientific construction project is large, its technology is complex, and its facilities are refined and good. Its completion will promote the development of our nation's new materials, new technology and new techniques, the elevation of the standards of industry, provide a forceful means for basic research and applied research, and train many scientific and technological talent. We believe the development of our nation's high energy physics will contribute greatly towards our nation's realization of the four modernizations and especially towards the realization of the modernization of science and technology.

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CSO: 4008

APPLIED SCIENCES

TECHNIQUE OF USING OXYACETYLENE FLAME TO CUT CONCRETE DESCRIBED

Beijing GUANGMING RIBAO in Chinese 10 Sep 80 p 1

[Article: "Gas Welder Li Benmao With Only Elementary School Education Sucessfully Develops a New Technique Using Gas Welding to Cut and Low Temperature Flame to Bond Concrete"]

[Text] GUANGMING RIBAO reporter Dong Kegong [5516 0344 1872] and AN GANG BAO reporter Wang Zhongfang [3769 1813 5364] report: Gas welder Li Benmao [2621 2609 5399] of the civilian buildings company of the Anshan Steel Mill successfully developed the new technique and new technology of using oxyacetylene flame to cut concrete and using low temperature flame to preheat and bond concrete in February of last year and in August of this year respectively.

Li Benmao only had an elementary school education. Beginning on the day in 1958 when he joined the plant, he studied hard and delved deeply into technology. Gradually he grasped the skill of cutting and welding many kinds of metals. At the same time, he compiled a draft for a book of 150,000 words entitled "Fundamentals of Gas Welding" based on over 20 years of practical experience.

The use of oxyacetylene flame to cut steel and iron had already been popularized in production a long time ago. But to use it to cut concrete was not an easy task. Li Benmao saw that when workers installed water pipes, gas pipes and heating pipes, they had to use drills to drill holes in concrete slabs. This required a lot of work and a lot of strength and it was not safe. He thought: can a gas welding torch be used to burn a hole in concrete? When he told the technicians and leadership personnel about his idea, he immediately received their support.

The key to using gas welding flame to cut concrete is to solve the problem of explosion of the concrete. To overcome this difficulty, Li Benmao conducted over 200 experiments. One day, as he was cleaning the mouth piece of the cutting torch, several drops of sulfuric acid dropped onto the concrete and a chemical reaction immediately occurred. He aimed his welding gun at the place where the sulfuric acid had eroded away the concrete. No explosions occurred and the concrete melted. That afternoon, with the help of the foreman and the work instructor, he spent over 2 hours the first time to burn a hole 100 millimeters in diameter through a concrete wall 270 millimeters thick. Later, Li Benmao received help from the chemistry teacher of the health school and technicians of his own unit to make three kinds of more ideal chemical agents to radiate heat and to prevent explosions. The body of the cutting torch was also reformed, and a new type of cutting mouth piece and acetylene generator were designed. Thus this new technique was continuously improved and perfected. Concerned departments tested the devices and determined that they produced remarkable results in cutting holes of various diameters in concrete structural components under 300 millimeters thick with oxyacetylene flame. Only 20 minutes were required to burn a hole 80 millimeters in diameter through a concrete wall 140 millimeters thick. The work efficiency was 8 times higher than manual labor, and the cost was only [illegible]. The strength of the concrete 20 millimeters away from the hole was not affected.

This new technique of using oxyacetylene flame to cut concrete has a very high practical value in the construction industry, therefore it has received widespread attention. Up to the present, over 1000 people have become students of Li Benmao and have grasped this new technique. This new technique not only received widespread popularization and use throughout the nation but new renovations have been countless. At Anshan Steel Mill alone, such technologies as using oxygen flame for cutting, electrical welding torch for cutting and electric arc cutting have emerged. The scope of materials being cut also gradually expanded to include heat resistant bricks, red bricks, bricks made of mineral dregs, granite, ferrous rock and porcelain, altogether over 10 kinds of nonferrous construction materials.

Li Benmao did not stop after achieving success in successfully developing this new technique. In April of this year, he also began to study bonding and welding of concrete. In a period of over 3 months, he read over ten books related to the subject and many materials. He utilized holidays three times to go to the mountain regions over 100 li away to learn the skills of old stone cutters among the people. With the help of comrades and after 29 repeated experiments, he successfully developed in early August the new technique of using low temperature flames to preheat and bond concrete. Testing and evaluation showed that under a load of 1500 kilograms, a seam in a prefabricated slab of concrete bonded by this new technique will not change or break in any way. In a test of strength of a test sample made of bonded materials and placed under a 60-ton press, the strength of resistance to pressure per square centimeter was 245 kilograms. This new technique has the advantages of being economical, practical and easily popularized. It can also help the state conserve massive amounts of cement, steel and such construction materials.

To give recognition to the achievements of Li Benmao, the Anshan Steel Company and the people's government of Anshan City promoted him to technician and gave him a two-level raise in wages, and bestowed upon him the honorary titles of model laborer of Anshan Steel Company and model laborer of the city.

[illegible]
CSO: 4008

APPLIED SCIENCES

DEVELOPMENT OF SYSTEMS OF STRUCTURES OF INDUSTRIAL BUILDINGS

Beijing JIANZHU JIEGOU XUEBAO [JOURNAL OF BUILDING STRUCTURES] in Chinese Vol 1 No 3, 5 Aug 80 pp 49-54

[Article by Chen Minsan [7115 3046 0005] of the General Institute of Design of the First Ministry of Machine Building: "On the Development of the Systems of Structures of Industrial Buildings"]

[Text] (Abstract) This article is an introduction to the development of the systems of structures of industrial buildings in our nation and points out some problems in the development of systems of structures of industrial buildings which need to be solved and some methods of solving them. It also describes the trend in the development of modern industrial buildings.

Industrial architecture is an important part of architecture. Hastening the development of the system of structures for industrial buildings not only has an important significance in the industrialization and the modernization of architecture but also has a definite significance in hastening the basic construction of industry and business.

1. The Development of the Systems of Structures of Industrial Buildings

Since the founding of the nation, our country's level of technology, design, construction and installation in the science of structures of industrial buildings has risen greatly and great achievements have been made. The first five-year plan began large scale industrial construction. The style of the structure of industrial buildings during this period was characterized by boards, supports, pillars and brick walls. Sturdy factory buildings were mainly built with steel structures. Medium and light factory buildings were mainly built with cement. In the making of structural components and on-site construction, small components were mostly prefabricated in factories and large components were mostly built on site. Mechanized means were mostly used to lift and install the components in place. Therefore, basically the design, manufacture of components and installation constituted a set of operations, forming a kind of system of industrial building. Because of the limitations of building materials, heavy materials were used for roofs and peripheral structures, such as large boards for housing and brick walls. As to the usefulness of these structures, this kind of system of architectural structures is safe and reliable and can satisfy the demands of production. Its shortcoming is that the building structure has a heavy dead weight, it uses a lot of materials and labor, and in its course of development, this system was used without any regional differentiation and regardless of weather conditions. This was obviously not a system that was suitable overall. Through the first 5-year plan, this kind of system of building structures established a foundation throughout all regions of the nation. Therefore, during a very long period afterwards, industrial building also adapted this system of building.

After the revolutionary movement in design, a new system of building structures emerged, for example, prefabricated folded plates, double T boards, saddle shaped shell boards, tubings, door type steel frames, and raised board structures. These structural systems were basically good in practical application.

Beginning from 1974, the State Capital Construction Commission campaigned for the development of a system of structures for industrial buildings to hasten the development of industrialization of architecture. Changzhou, Wuxi and Taizhou areas were regions where the work in systems of structures of industrial building developed relatively early in our nation. In 1975, the State Capital Construction Commission's former architectural science research institute held a panel discussion on the systems of industrial buildings. Topics discussed included how standardization of single structural components should develop into systematized architectural structures for entire factory buildings. This question concerning the system of structures of industrial buildings began to be noticed by people. To hasten the development of the system of structures of industrial buildings, the Committee on structures of the Chinese Architectural Society will hold an academic discussion meeting on the system of structures of industrial buildings this year. We recently went to several concerned localities and gained some understanding of the systems of structures of industrial buildings. Our observations are briefly described below:

(1) The System of Structures of Industrial Buildings of a Single Story in Changzhou

This system uses boards, supports, pillars and wall boards for the form of the buildings structure. It is an improved version based on the traditional system of building structures. The following work was done:

1. The degree of standardization of the design was raised. A general purpose design was drawn up. It can be used to assemble 322 shops of a definite type.

2. Structural components were mass produced in factories. They started out by taking the city as a whole in their unified planning. Old enterprises were assigned different tasks according to specialization and

rational distribution principles, gradually forming a system for the building industry in which the frontline and the supporting factories at the rear produce materials that compose a set.

3. The structural components are fixed and modular in form and in dimensions.

4. Construction was mechanized. Large and medium sized machinery was equipped as key facilities and for centralized use. Machinery groups were coordinated as sets and used to install, lift, transport and dig and move earth for large size structural components in construction projects throughout the city.

Testing of the system of structures of industrial buildings of a single story in Changzhou resulted in a rise in the rate of productive labor and a lowering of the amount of consumption of materials.

(2) The System of Structures Built With Reinforced Concrete

This system belongs to the system using boards, supports and pillars in architectural structure but the structural components of various types of structures are put together by concrete tubings produced by the centrifugal method. Examples are supports and pillars for houses. The system of tube structures has been widely popularized in the Sichuan area and is also frequently used in Hubei and Anhui.

The structural components of the tube structures are formed by pouring by the centrifugal method. They are strong and are of good quality and the factories produce them in batches. The efficiency of production is high. This coincides with the direction towards industrialization. The structures built with these components are light and have beautiful appearances. But production of the tubes requires a set of facilities and installation of some components such as supports for houses requires more work.

(3) The System of Structures of Door Type Frames

This system is a form of architectural structure combining the beam and the pillar. The beam and the pillar are joined as a whole by hard joints. This system had already been used during the beginning period of the 1950's in Shanghai. After the 1960's, this system of door type steel frame structures was used in Taizhou in northern Jiangsu to build over 40 factory buildings. They constitute a single and independent system.

(4) System of Folded Plate Structures

Many localities in the country have used folded plates for roofs. According to incomplete statistics, there are already close to 1 million square meters of industrial and civilian buildings that have used this type of structure. Folded plates are generally produced by assembly lines. They are relatively easy to manufacture, their dead weight is relatively light, and their economic characteristics are better. A completed structure using folded plates is a spatial structure. Its degree of hardness is high and its resistance to quakes is good. The problem of light and ventilation in structures of folded plates is not easy to solve and they are better suited for single span structures. But their heat retention and insulation are poor and appropriate measures should be taken during their design.

Folded plates can be used not only for roof structures but can also be used as verticle weight bearing wall panels. This type of structure using only folded plates was built in Fuzhou on an experimental basis and the results have been relatively good.

(5) The System of Double T Boards

As a form of architectural structure, this is a kind of combined structure of boards and supports. This type of structure had been used in our nation during the 1960's but it was not popularized. This type of boards can be used as surface boards for houses as well as for floor boards and the varieties are few. It is suited for the needs of various widths of span and various loads. This type of boards can be produced on an assembly line and it is easy to manufacture. But the boards are heavy and when the width of the span is greater than 12 meters, it is more difficult to lift and transport the boards. This affects the popularization of this type of structures.

The double T boards can be used for roof structures and also for weight bearing outer wall boards. They can form a structural system using only double T boards. This system has been tested in Wuhan. This system is better suited for constructing small factory buildings that are not too tall.

(6) The System of Structures of Saddle Shaped Shell Boards as Roofs

Saddle type shell boards are a structure combining boards and supports. They have been tested in the Hangzhou area beginning in 1972 and at present many buildings in the Zhejiang area have used this type of structure.

Saddle shaped shell boards as roofs have few varieties of components and lifting and installation are fast. Saddle shaped shell boards have a curvature in two directions and their manufacture is more complex. A definite experience is required. When the width of the span is greater than 12 meters, it is more difficult to lift, install and transport saddle shaped shell boards.

(7) The System of Structures of Raised Boards

This type of system actually is a kind of board and pillar structure. The pillar is prefabricated in whole at the site. The board is placed flat on the ground layer after layer and cast. After they have been installed in place, an electrically operated lift is used to lift each layer of boards to a predetermined height. Then an instantly poured cap or sheer block or a weight bearing pin is used to affix the board on the pillar. This type of structure can be used to build multiple layer factory buildings, warehouses and laboratories. Construction of this type of structure requires less working space, the amount of work which has to be done at high levels is reduced and the height of the structure is reduced but the amount of steel required is large.

(8) The System of Structures of Multiple Layer Frames and Supports

The pillars can be prefabricated or instantly poured. The beams are generally prefabricated beams like the handles of flower baskets. On the sides of the beams are legs to support the floor boards. The boards are usually prefabricated trough boards. After they are installed, another layer is instantly poured so that the board and the beam become one whole unit. This type of system is being used more in building multiple layer factory buildings at present and the results are better.

In addition to some of the systems mentioned above, there are also the system of network and support structures and shall structures for roofs in building single story industrial factory buildings. These are scarcely used in our nation and they will not be described.

II. What Are the Problems That Need To Be Solved in Developing the System of Industrial Buildings?

Although the system of industrial buildings have already been tested at some localities, there are some prerequisite problems that have not been solved satisfactorily. These prerequisite problems cannot be solved by one locality or one unit. Therefore, it is very important that the committee on structures of the Chinese Architectural Society organize a meeting to exchange and discuss the experience and the problems in developing the system of industrial buildings.

(1) The Problem of General Design and Standardization

The development of a system of industrial buildings involves each of the aspects of design, materials, production of structural components, construction and installation. Of these, design is the foremost and primary aspect. The problem of generalized design and standardization must be solved well before production can be industrialized. At present, the reasons that the systems of industrial buildings cannot be unified are: First, because the nature of production of each profession is different, the demands for industrial buildings are also different. This is why there are various kinds of different industrial buildings. The function of the buildings are different, therefore there are different forms of buildings. For example, there are single story industrial buildings and multiple story industrial buildings. Single story industrial buildings also include tall, large and heavy buildings and medium, small and light buildings. This means that many types of systems of structures of industrial buildings are needed to adapt to the needs of different professions. Second, because of our nation's economic system, there are the various design institutes of the central offices and there are also regional design institutes. Projects of the various departments of the central government are designed by the design institutes of the departments of the central government. Regional projects are designed by regional design institutes. Each has its own traditional ways of doing things, therefore some can be unified while others cannot. For example, the standard designs for structural components include the "state standards" and also the "departmental standards," the "provincial standards," and some large design institutes also have their "institute standards," thus the kinds of standards for structural components are many. In the construction and production of a region, there are projects designed by the locality, and there are also projects designed by the various departments of the central government, thus standard structural components cannot be standardized.

The first reason described above is objective but it is not true that the buildings of different professions have no common points. The common things must be found among the different things. The second reason is subjective. As long as there is an agency that will be responsible for carrying out the work, unification can be realized.

Should a generalized system be set up or should specialized systems be set up? We believe that under the present conditions in our nation, the major system should be a generalized system and where conditions permit, specialized systems can also be set up. The generalized system involves different combinations of a whole set of standard structural components and general purpose parts to form buildings of different parameters to satisfy different demands. The structural components of this kind of a system are standard but they can be put together to make buildings of different parameters. This possesses a definite versatility. Specialized systems not only have standard structural components but the parameters of the buildings are also fixed. These types of systems have fewer varieties of standard structural components than a generalized system, but lack versatility.

Should a generalized system usable throughout the nation be set up? At present, building systems are all based on the locality as the unit. The systems are modified according to the principle of specialization and distribution of labor by the processing plants and construction teams of the area to adapt to the needs for industrialized production. This way is correct from the regional point of view. But if a region has projects designed by the region and also projects designed by the various departments of the central government, the system of buildings specified by the locality will not necessarily satisfy the needs of the design institutes of the various departments of the central government. Therefore, a second system is needed to satisfy the different needs.

From the point of view of the design institutes of the central government, their design projects are scattered at various localities throughout the nation, and it is hoped that there is a generalized system to adapt to the needs of the various localities. If there are only regional systems and there is no generalized system usable throughout the nation, their work will be very difficult. The only way is to have both a regional system of building and a generalized building system usable throughout the nation. When the regional system can be used it should be used and when the regional system cannot be used then the nationally usable system should be used. In this way, most of the medium and small factory buildings can use the regional system and the few tall factory buildings can use the nationally usable system. If the regional system can coincide with the nationally usable system, then the work would be even simpler.

(2) Setting Up a Unified Building Parameter and a Fixed Type of Shops

To launch the work in setting up a system for industrial buildings, each profession must be taken as a unit first to establish the parameters and the fixed shop designs for industrial buildings of each profession. The department in charge of the profession should be responsible for setting up the system. According to the present system in our nation, factories of one type of profession may not be under the ministry of one industry. For example, the factories of the machinery industry are under the First Ministry of Machine Building but also under the ministries of other machinery industry and the agricultural machinery ministry. Other ministries also have machinery factories (such as the machinery repair plants of the ministry of metallurgy, chemical industry equipment manufacturing plants of the ministry of chemical engineering, the locomotive and car manufacturing plants of the railroad ministry, textile machinery manufacturing plants of the textile ministry, engineering machinery manufacturing plants of the State Capital Construction Commission, etc) that all belong to the machinery industry. The First Ministry of Machine Building can act as the central organ to coordinate other related ministries to set up unified parameters and a fixed design for shops.

Secondly, because there are commonalities between one profession and the other professions, the commonalities can be unified. First, the building parameters and a fixed design for shops can be established uniformly for similar professions and be expanded gradually to other professions. The work involving the unification of standard designs for structural components has already been carried out by the institute of standards of the Chinese Architectural Science Institute for a relatively long period. Many national standard designs for structural components have been organized and compiled. The structural components themselves are basically applicable, safe and economical. But more improvements are needed in the entire structure and in reducing the types of structural components and establishing fixed modular boards. Many standardized structural components lack interchangeability. If one structural component is replaced by another type of structural component, then most of the blueprints will have to be revised.

This causes a lot of trouble in design and construction. We believe standard structural components must possess a definite interchangeability. The same type of standard structural components should have a unified dimension themselves and the joints between component parts must also be standardized.

(3) Selecting Suitable System of Building Structures

Evaluation of a system of building structures must take into consideration such aspects as range of adaptability, building speed, consumption of materials, rate of productive labor and construction costs. Therefore, a better system of building structures should have a wide range of applicability, a fast construction speed, consume less materials, have a high rate of productive labor, and a low construction cost. To realize these demands, first, the buildings must possess a definite versatility to adapt to the needs of many professions, second, the design must be generalized, the shapes must be fixed to reduce the varieties of structural components; third, manufacture of structural components must be simple to adapt to the requirements of mass production in factories; fourth, the transportation, and the lifting and installation equipment of the structural components must be easily solved; fifth, the dead weight of the building must be light to reduce the amount of materials used.

Selecting regional systems should be based on actual regional conditions. A building system must suit the locality and the local conditions such as the nature of the profession, the supply of materials, the construction capabilities and the available machinery and equipment. The building systems presently being developed in our nation by some industries all have definite advantages and ranges of adaptability and they can be used as regional systems. For example, in the Sichuan area there is a cement tubing plant that has definite experience in tube structures and thus tube structures can be developed. Again for example, in the Hangzhou area there is a definite experience in saddle shaped shell board structures and thus the saddle shaped shell board structures can be developed. Generally, measures must be suited to local circumstances, and local conditions must be used as the basis for selecting a system that is suitable for the locality.

In selecting a system that is generally applicable throughout the nation, special attention must be paid to a wide range of applicability and easy acceptability at all localities. In view of the present situation, only the traditional system of structures of industrial buildings, i.e., the system using boards, supports, pillars and wall boards can be used as a nationally applicable system. Because the range of applicability of this system is wide, it is applicable for building different types of shops of many different professions. Secondly, this system already has a certain foundation in all places throughout the nation and it is easily accepted by everyone. Although the structural system combining the board and the support has such advantages as having only a few types of structural components, but when used for multiple span buildings, light and ventilation problems cannot be easily solved. When the span is large, there are definite difficulties in transportation and installation. Therefore, in view of the present situation, this type of structural system can be used as a regional system but it is not suitable as a nationally applicable system.

III. The Trend of Development of Modern Industrial Buildings

The trend of the development of modern industrial buildings is definitely related to the system of structures of industrial buildings. It is an important question that must be taken into consideration in developing a system of structures for industrial buildings.

(1) Modern industrial buildings not only require that industrial architecture itself must reach a modern level, more importantly, industrial architecture must be able to adapt to the demands of modern technological production. The purpose of industrial architecture is to provide facilities and equipment and sites for production lines for technological production and to provide support for conveying machinery within the shops and a good working environment. Because science and technology develop ceaselessly, because products continually renew themselves, the technology of the flow of production, facilities and equipment must be correspondingly adjusted. Modern industrial architecture must also adapt to the needs of such adjustments. Therefore, industrial architecture must satisfy the demands of present technological production in design and also must take into consideration a certain versatility to adapt to the needs of future development and changes in production.

Secondly, construction of a large plant frequently is not completed in one effort but is planned before hand and constructed in phases. Therefore, during the design of the plant, the overall plan must include space for expansion. The architectural structure must take into consideration the possibility of expansion so that the development of the plant can be versatile. The following aspects should be included:

1. Expand the pillar network of the building structure or use a square network of pillars.

The distance between pillars can be expanded from 6 meters to 12 meters or larger. This will provide the plans for the facilities with more versatility and make it easier for future adjustment. Batch produced production shops can use a 12 x 12, 18 x 18, 24 x 24 square network of pillars. These are not only beneficial to planning of the facilities but also production lines can be planned on both sides. Therefore, the planer form of this type of factory buildings tends to be rectangular.

2. The ground surface of the shops must have a definite hardness to facilitate placing of several lathes directly on the surface without having to build a foundation. Electrical wiring and ventilation facilities should be installed inside the spaces of the frames of the buildings as much as

possible. Joints of the frames should be designed for possible handing of pulleys and suspension chains. Shops equipped with bridge type pulleys should consider the possibility of elevating the pulleys.

4. Partitions inside the shop should be made of light weight materials to facilitate removal. Outer walls that will have to be expanded should not be built with permanent structures, and the body of the wall must be built with light weight materials or assembled wall boards should be used to facilitate removal. Tubing outside the building should be planned in such a way that it will not have to be moved as much as possible during future expansion.

5. The height of the factory building should satisfy the demands of installation and utilization of the tallest equipment. The net space on top of the bridge type pulley should be appropriate.

(2) The second trend in modernized industrial building is the use of joint factory buildings. Production work and departments of different nature are set up inside one factory building of a large area, such as setting up metallurgical work, punching, welding, heat treatment, assembly, painting and warehousing all inside one factory building. Light partitions and passage ways are used to separate them. The advantage of large area joint factory buildings is that planning is compact, the distances for technological flow and materials transport are short, tubing and wiring distances are short, the outside surface area of the building is small, consumption of heat is less and less space is required. In addition, large area joint factory buildings are a necessary means to realize versatility. Without sufficiently large area, planning and adjustment of the production flow lines will not be possible.

However joint factory buildings have their problems:

1. There is the possibility that each work compartment may interfere with the other because of the different nature of production, for example, smoke, dust, vibration and noise of one work compartment may affect the other compartment. Therefore, when planning each work compartment in a joint factory building, smoke, dust, vibration and noise of each must be within the sanitation standards and allowed limits of production.

2. Ventilation of a large area factory building is a problem that is not easily solved. Especially in southern regions, ventilation during summer is a major problem. If mechanized ventilation is used, the one time investment is large and often the cost of electricity and maintenance is great.

3. There are definite difficulties in management. The joint factory buildings have many work compartments of different production characteristics and these necessarily bring about difficulties in management. If a definite management level is lacking, production may be affected by mutual interference.

4. One of the more outstanding problems of the joint factory building is the problem of fire prevention. Because the area of the factory building is large, a fire can easily spread and fire fighting is more difficult. The loss incurred will be much greater than a medium or small sized factory building. Reinforced concrete structures are very good insulating materials against fires. But steel structures are not. Under 450°C, they will lose their load bearing capability. In a joint factory building, tubing and ventilation equipment are mostly placed inside the spaces between the frames of the buildings. Since the joints of the frames must also be able to hold suspended loads, the frames are often steel. Therefore the area of the factory building is limited by the standards for fire prevention. Installing automatic fire fighting equipment inside the factory building can raise the limitations on the area of the factory building but the construction costs are higher.

Whether the area of the large area joint factory building should be large or smaller is a question that has many different viewpoints in various nations. In the United States, public utilities are developed, the price for electricity is low, artificial adjustment of indoor climates can be used, therefore the Americans advocate larger areas. In Europe, the price for electricity is higher, and generally consideration is given to the utilization of natural light and natural ventilation, therefore a smaller area is advocated. According to the present situation in our nation, natural light and natural ventilation should be utilized as much as possible, and the management level is not high, thus the area of joint factory buildings should be smaller.

(3) The third trend in modern industrial buildings is the use of multiple story factory buildings. In cities, land is generally very scarce, and prices for parcels of land are high, therefore building factories in cities should conserve the use of land as much as possible. In farm villages, land for agricultural use is also precious and conservation of land should also be practiced. Multiple story factory buildings have provided the condition for conservation of land. Light industry factories, electronics and electrical appliances factories, instruments and meters plants and light machinery processing plants can all utilize multiple story factory buildings. In recent years in our nation's large and medium sized cities, the proportion of multiple story factory buildings have increased. In foreign countries, foundry shops for mass production have also used multiple story factory buildings. Multiple story factory buildings have already become a trend of development in industrial buildings.

Some problems still exist in multiple story factory buildings, such as the vibration of the equipment that causes the factory building to vibrate, thus affecting the accuracy of testing and precision of processing, and the problem of the effect of oil from the machinery upon the floor boards.

(4) The fourth trend in modern industrial buildings is the creation of a good working environment for production. The working environment should

include light, heat, ventilation, reduction of smoke and dust, reduction of noise, color, and service facilities. A good or bad working environment not only affects the health of the workers but also affects the efficiency of production. Foreign industrially advanced capitalist nations place a lot of emphasis upon working environments. Our nation also places emphasis upon labor protection but because of insufficient understanding, the working environment inside factories remains to be elevated. In the past, there was an insufficient understanding of the damage caused by noise and it was believed that noise only affected man's hearing. In actuality this is not only so but being in a noisy environment for a long period will not only affect man's nervous system and cardiovascular system but it may seriously cause heart diseases. Last year, the state issued regulations stipulating that the level of sonic pressure of noise at places of work must not surpass 85 decibel A. The noise level in many shops is still higher than this level, and everyone's efforts are needed. Another problem is the insufficient recognition of how to handle the function of colors. Color treatment has already become an indispensable link in modern industrial factory buildings in foreign nations. Color treatment can elevate the efficiency of indoor lighting to give the environment inside the factory building a sense of brightness, reduce fatigue of the eyes of workers, heighten the workers' enthusiasm in production, elevate the efficiency of production and the quality of products and reduce accidents related to production. All that does not require a lot of expenditure and that will benefit socialist production should be actively promoted to create a good environment for the workers for production.

This article was written in conjunction with the "academic discussion meeting on structural systems for industrial buildings" to be held this year by the Committee on Structures of the Chinese Architecture Society. Its purpose is to stimulate everyone's interest in discussing these questions and to prepare the conditions for a good conference. It is hoped that the mistakes in the article can be pointed out and criticized by readers.

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CSO: 4018

APPLIED SCIENCES

BRIEFS

FUJIAN TELECOMMUNICATIONS--Fuzhou, 2 Oct (XINHUA)--A new integrated circuit telephone exchange that can handle 10,000 telephones has gone into use in Fuzhou, capital of Fujian Province, in southeast China. This will improve the province's telecommunication facilities. An automatic exchange has been installed in Xiamen, a major coastal city in the province. A long-distance communication symmetric cable carrier wave, which runs from Fuzhou to Xiamen and to Zhangzhou City, is under construction. The section from Fuzhou has already gone into use. When the project is completed, Fuzhou to Putian, Quanzhou, Xiamen, Zhangzhou and other coastal cities and counties will open long-distance automatic or semi-automatic dialing. [sentence as received] Apart from installing China-made automatic exchanges, Fuzhou plans to import advanced telecommunication equipment. Fujian Province plans to build a microwave circuit that runs from Fuzhou to the southern part of the province and a satellite communication ground station. [Text] [OW051145 Beijing XINHUA in English 0742 GMT 2 Oct 80 OW]

SHANGHAI INTEGRATED CIRCUITS--Shanghai, 7 Oct (XINHUA)--Three series of small-scale integrated circuits for electronic computers and digit-control equipment have been put into serial production in Shanghai, East China. These products, which China previously had to import from abroad, are of the SN74, SN74H and SN74S series now in common use internationally. They are expected to facilitate China's designing and manufacturing of small, standardized computers of high operating speed and reliability. Examination by experts concluded that the quality and performance of the new products and their technological parameters are up to advanced world standards. [Text] [Beijing XINHUA in English 0706 GMT 7 Oct 80 OW]

JIANGSU MICROWAVE RECEIVER--After 2 years of work, three engineers and two assistant engineers at the solid state devices research institute, Nanjing, Jiangsu, have developed a microwave receiver which is useful in developing microwave devices, satellite communications, radar and so forth in our country. [OW071105 Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 5 Oct 80 OW]

GANSU LONG-DISTANCE TELEPHONE CIRCUITS--A set of advanced microwave long-distance telephone circuits installed by the Gansu Provincial Posts and Communications Department will go into operation in Lanzhou Municipality on 11 October. The new circuits connect Lanzhou with Beijing, Shanghai, Hankou, Chengdu, Chongqing, Changsha, Kunming, Jinan, Nanjing and six major cities of the country. [Lanzhou Gansu Provincial Service in Mandarin 1125 GMT 30 Sep 80 SK]

CSO: 4007

LIFE SCIENCES

BRIEFS

TRADITIONAL CHINESE MEDICINES--Kunming, 12 Sep (XINHUA)--A society of traditional Chinese medicine and natural medicine has been set up at a symposium on the production and use of traditional medicines held in Kunming, southwest China. The society will function under the aegis of the Chinese Pharmaceutical Association. More than 800 pharmaceutical factories throughout China now produce nearly 3,000 types of traditional Chinese medical preparations, according to speakers at the symposium. The speakers exchanged views on the theory and application of traditional Chinese medicine and discussed the use of extracts from plants, marine products, animals and minerals as ingredients of Chinese medicines. More than 800 papers were submitted, some of which were discussed at the symposium. [Text] [Beijing XINHUA in English 1210 GMT 12 Sep 80 OW]

MEDICAL NEWS--Beijing, September 1 (XINHUA)--China has built up a network of 40 tumor hospitals and institutions for cancer research, some of which are in high-incidence areas. They are concentrating on studying gastric cancer, esophagal cancer, liver cancer and cancer of the lung. The General Hospital in Nanjing army units in Jiangsu Province has come up with its first multi-purpose computer for medical use. It is claimed to be able to work out diagnosis, figure out prescriptions, store data and handle statistics. Hypertonic citrate adenine solution which preserves human kidneys for transplant operations is being produced and used by the Shanghai central blood center and the Changzheng Hospital. The solution can keep a kidney useable for up to 30 hours and 38 minutes. An infrared T.V. camera for photography of the eye has been developed by the Changchun Institute of Optical and Precision Machinery and the Norman Bethune Medical College. [Text] [OW010712 Beijing XINHUA in English 0712 GMT 1 Sep 80]

FETUS DEFECT TESTS--Beijing, 19 Sep (XINHUA)--Beijing's municipal family planning research center is using a simple blood test to detect neural tube defects in fetuses from the 14th to 20th weeks of pregnancy. The test, called immunodiffusion radioautography, is advanced by Zheng Zhenqun, a lecturer at Shanxi Medical College. It is used to detect the A (alpha) fetal protein contents in blood serum of the mother. The standard a fetal protein contents of normal fetuses in different weeks of pregnancy were established by the center between 1978 and 1979 in tests on 695 pregnant women. Gu Sujuan, head of the center, said that the A fetal protein contents of pregnant women who have fetuses of neural tube defects can be much higher than normal, but it also happens in twins and fetuses which died in uterus. Therefore, the blood test results have to be checked by ultrasonic chart examination. The accuracy rate of the test is about 75 percent. But this method, simple and acceptable, can be used as a clinical screening for neural tube defect fetuses. [Beijing XINHUA in English 1244 GMT 19 Sep 80 OW]

CSO: 4020

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BRIEFS

PRC-UN UNIVERSITY TIES--Beijing, 2 Jul--Dr James M. Hester, visiting rector of the United Nations University, signed an agreement in Beijing Tuesday with Li Chang, vice president of the Chinese Academy of Sciences, on cooperation between the two organizations. Under the agreement, the university, whose headquarters is located in Tokyo, and the Chinese Academy will cooperate with each other in research on natural resources and other sectors. This is the first time that such a full-scale agreement has been signed by the UN University with China. Hester also signed Tuesday a separate agreement with the Chinese Institute of Geography under which the institute will become an associated institute of the university. Under the two agreements, the university will cooperate closely with China in the future on various research projects, including those concerned with agricultural and marine production in the southern part of China. The university also is scheduled to hold a research meeting in Beijing in September on cultivation and utilization of land. [Tokyo KYODO in English 0024 GMT 2 Jul 80 OW]

FILM GROUP TO JAPAN--Beijing, August 27 (XINHUA)-- A film group from the Beijing Scientific and Educational Film Studio will leave Beijing for Japan tomorrow. This first group from China to shoot a scientific film in a foreign country is composed of scenarist and director Zhang Qing and two cameramen, Wang Fengming and Liu Jianzhong. An 80-minute science film "Notes on Japan" will cover scientific industrial management and mechanized farming, as well as scenes of local color. Fifty-year-old Zhang Qing has been in film work for nearly thirty years. She wrote and directed the film "Biological Evolution" on plants and animals. The film won an award for the best films this year from the Ministry of Culture. Another of her films "Earthquake" has had the biggest circulation in this country with more than 9,000 copies. Wang Fengming shot both films. Hu Benli, director of the Beijing Scientific and Educational Film Studio, said that the group's visit was arranged in accordance with an agreement between the China Film Co-production, the Beijing Scientific and Educational Film Studio and the Iwanami Film Studio of Japan. A Japanese film group had returned home after shooting two 20-minute films on China's physical geography, industry and agriculture. [Text] [Beijing XINHUA in English 1208 GMT 27 Aug 80 OW]

ASIAN, PACIFIC SCIENCE MEETING--Beijing, August 25 (XINHUA)--An Asian and Pacific regional consultative meeting on science and technology opened here today. The meeting is convened by the U.N. Economic Social Commission on Asia and Pacific (E.S.C.A.P.). It will discuss the strengthening of regional scientific and technological work and cooperation among regional countries in line with the 1979 Vienna programme of action adopted by the U.N. conference on science and technology for development. Attending the meeting are representatives from Australia, Bangladesh, China, India, Malaysia, Nepal, New Zealand, Pakistan, Papua New Guinea, the Philippines, Sri Lanka and Thailand as well as representatives from some United Nations institutes. J.B.P. Maramis, executive secretary of the E.S.C.A.P., presided over today's opening ceremony. Jiang Ming, vice-minister of the State Scientific and Technological Commission of China, made a speech at the meeting. To mark the occasion, a reception was given by Wu Heng, vice-minister of the State Scientific and Technological Commission, in the great hall of the people this evening. [Text] [OW251614 Beijing XINHUA in English 1607 GMT 25 Aug 80]

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TITLE: "Thermodynamic Computation of Gas, Liquid Equilibrium in NH_3-H_2O System (First Report)"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 1, Feb 80 pp 2-5

ABSTRACT: The need for developing a work procedure for urea rekindled the interest in the ammonia-water system, especially the occasion of encountering thick aqua ammonia in the production process. An experiment work on gas, liquid equilibrium of the NH_3-H_2O system was carried out to find a simple model of thermodynamic expression that is capable of precisely describing the nature of equilibrium of gas, liquid in the system under the condition of $X\ NH_3 \geqslant 0.4$, $t = 30 \sim 60^\circ C$, $P = 1.30 \sim 23.8$. The experiment proved that the computation results are satisfactory. On this basis, a block diagram for computing p, y from T, X is offered to provide a computation model for engineering designing.

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TITLE: "Solvent Elementary Sulfur Method of Removing Sulfides in Gas Phase (Dymethyl Sulfoxide Method)"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 1, Feb 80 pp 8-10

ABSTRACT: For the developing petrochemical, chemical fertilizer, and metallurgical industries, coal is used as the major fuel with gradually increase of the petroleum ratio. In gasified coal, oil field by-product gas, or natural gas, sulfides exist, mostly in the form of hydrogen sulfide with some organic sulfides such as CS_2, COS, RSH, etc. These sulfides corrode the equipment, cause the catalyst to be poisonous, and pollute the atmosphere; therefore, they must be removed. There are many desulfurizing methods and the choice depends upon the fuel and its sulfide contents. This paper introduces a new method of using organic solvent as the absorption agent. It can remove gaseous phase sulfides and produce sulfur at the same time. The chemical theory, the experimental method, and the needed equipment are described.

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TITLE: "Research on the Fertilizer Effect of Nitric Acid Suspension Phosphate Fertilizer"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 1, Feb 80 pp 10-13

ABSTRACT: At present, the major phosphate fertilizer used for agricultural production in China is calcium perphosphate. With the increased unit yield of recent years and the expansion of high yield acreage, the quantity of calcium phosphate cannot meet the demands. Meanwhile, the aqua ammonia and ammonium carbonate produced by fertilizer plants of the county level are not chemically stable. After transportation, storage, etc. the nutrient utilization rate and the economic effects are poor. For the purpose of resolving these problems, the Shandong Provincial Institute of Chemistry studied and successfully made a new nitrogen-phosphorus complex fertilizer, with diluted nitric acid (36-38 percent) and ground phosphate rock (P_2O_5, 22-23 percent.) The major purpose is to utilize fully the intermediate to low grade phosphate rock which is plentiful in China. The experimental procedure is reported.

AUTHOR: GUO Bosheng [6751 0130 3932]
NING Jiaben [1337 0502 6321]

ORG: GUO of Research Academy of Colored Metals, Ministry of Metallurgy; NING of Hunan Provincial Academy of Agriculture

TITLE: "New Type of Trace Element Chemical Fertilizer--Nitric Acid Rare Earth"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 1, Feb 80 pp 14-18

ABSTRACT: Trace elements are an important part of modernized chemical fertilizer industry. An experiment of field study and laboratory research on the fertilizer effect of rare earths began in China in 1972, and a considerable amount of data have since been obtained. The data concerning the yield increase effects of liquid or solid $RE(NO_3)$ and $RECl_3$ on wheat, rice, corn, kaoliang, soybean, and vegetable crops are reported. The experimental results indicate that rare earth may promote nutritional growth, and the absorption and transfer of phosphorus of crops.

AUTHOR: None

ORG: Department of Scientific Research, Beijing Chemical Industry Experimental Plant

TITLE: "Summary of Intermediate Test of Improved Hydroquinone Desulfurization"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 1, Feb 80 pp 19-22

ABSTRACT: At present, the Beijing Chemical Industry Experimental Plant uses a modified arsenic method of desulfurization, with the arsenic content as high as 40 g/ ml to present a great danger to the health of the workers and the environment. Among domestic plants of ammonia synthesis, 2 major methods of desulfurization, the modified A.D.A. method and the aqua ammonia catalysis method, are generally adopted. At present, the supply of A.D.A. is a serious problem; even the raw materials have to be imported. The merits of the aqua ammonia are the fact that the raw materials of ammonia and hydroquinone are both easily obtained. The shortcomings are the fact that the degree of purification is not stable, the rate of secondary reactions is high, and the consumption of ammonia is extensive. Based upon foreign and domestic literatures, an experimental design of Na_2CO_3 - HO[illegible] OH was proposed to result in a 10 percent increase of desulfurization rate, obvious reduction of soda consumption and the rate of secondary reactions, and an efficiency close to the modified A.D.A. method.

AUTHOR: None

ORG: Research Institute of Industrial Science, Shaoguan District, Guangdong Province

TITLE: "Making High Nitrogen Compost Fertilizer Through Pressurized Ammonia Oxidation of Peat"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 2, Apr 80 pp 2-6

ABSTRACT: The Shanxi Institute of Coal Chemistry, Chinese Academy of Sciences developed the technique of pressurized ammonia oxidation of efflorescent coal or brown coal to produce high nitrogen compost fertilizer a few years back. With respect to peat, the method of direct ammonification with aqua ammonia to produce humic ammonium is adopted in most cases. This method is simple and easy to do in native circumstances, but the nitrogen content of the product is low and the rate of organic matter utilization is not high either. For the purpose of reasonably utilizing this resource, an experiment was carried out to proceed with pressurized ammonia oxidation of peat. The reaction temperature, the pressure, the timing, and different degrees of stirring were preliminarily studied before the processes of selecting a catalytic agent to reduce the reaction pressure and using air to replace oxygen to improve the nitrogen content. The procedure and the conditions of the experiment, and the preliminary results of field tests are reported.

AUTHOR: None

ORG: Sichuan Chemical Industry Plant

TITLE: "Condition of Operation of the Work Procedure of Filling Globular Catalyst in the φ 800 Triple Casing Pipe Ammonia Synthesis Tower"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 2, Apr 80 pp 7-11

ABSTRACT: With the help of Zhengzhou University, Sichuan Chemical Industry Plant experimented with the work process of filling in the old system No 3 ammonia synthesis tower, the φ800mm triple casing type, with the globular catalyst experimentally made by Zhengzhou University. The temperature raising reduction process began on 24 Dec 78, and the production began 6 days later. In the past 6 months, the condition of operation has been satisfactory. The effect of the catalyst in raising the tower's capacity, reducing the energy consumption, improving the temperature distribution condition, etc. has been proved to be obvious. The work of filling the globular catalyst, and the conditions of reduction and operation are reported.

AUTHOR: LI [illegible]iqing [2621 1947 3237]

ORG: Division of Science and Technology, Shengli Petrochemical Plant, Shandong Province

TITLE: "Application of the Ammonia Absorption Cooling System in Shengli Petrochemical Plant"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 2, Apr 80 pp 26-28

ABSTRACT: This paper explains the basic principle of the ammonia absorption cooling system. The First Chemical Fertilizer Factory of Shengli Petrochemical Plant installed ammonia absorption cooling systems with a total investment of 1,283,500 yuan. These systems were put to production toward the end of 1972. The economic properties of the ammonia absorption equipment and the compression cooling equipment are compared in terms of capital investment, production cost, and maintanence cost. It is the conclusion of the study that ammonia absorption cooling system is suitable when the evaporation temperature is lower than -15°C, the cooled water temperature is low, the water is plentiful, the price of steam is low, and there is waste heat to be utilized.

AUTHOR: CHEN Tianlang [7115 1131 2697]

ORG: Department of Chemistry, Sicuan University

TITLE: "Introducing a New Iron Fertilizer--Urea Iron"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 2, Apr 80 pp 68-69

ABSTRACT: Plants usually contain 0.00190-0.015 percent of iron in the body. Previous research studies have proved that iron is not the component of chlorophyll, but iron is a contact agent in the process of chlorophyll formation and is also the important element of some oxidization enzymes. It also directly participates in plant respiration; therefore, it is necessary for the normal growth of plants. To this day, there remains no ideal iron fertilizer, however. Those which are believed to be highly effective in foreign countries are not adopted in China either due to their high prices or due to the fact that they are not produced in China in large quantities. Most recently, the North China University of Agriculture introduced a liquid iron fertilizer with a low iron content of 0.4 percent. It is also not convenient to store or transport. This paper introduces a new iron fertilizer, a complex of urea and iron, in green colored solid crystals. It contains about 9.3 percent of iron and about 35 percent of nitrogen. Test results of this new iron fertilizer are reported. There is no mention of the producer, however.

AUTHOR: WANG Zhizhong [3769 3112 0112]

ORG: Yinshan Phosphate Fertilizer Plant, Sichuan Province

TITLE: "Investigations Into the Common Calcium Production Portion of the Medium Low Grade Jinne Phosphate Rock"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 pp 13-18

ABSTRACT: For the purpose of improving the quality and reducing the cost of production, the project of studying the calcium production characteristic of the medium low grade Jinhe phosphate rock was launched. The Fe_2O_3 content of the rock is relatively stable, 3-4 percent; the R_2O_3 content is about 6-12 percent. The R_2O_3/P_2O_5 remains 23-53 percent, 3-6.5 times of the reasonable upper limit for producing common calcium. The MgO content is 2.5-4 percent; the MgO/P_2O_5 remains 10-15 percent, more than double the reasonable upper limit. The CO_2 content is 5.46-7.36 percent. Following a thorough analysis of the mineral and the work procedure, it is the conclusion of the study that the key to improvement is to control the maturation temperature of the late stage and the control of the density of the slurry.

AUTHOR: LIAO Jincai [1675 6930 2624]

ORG: Zhangshu School of Agriculture, Jiangxi Province

TITLE: "Preliminary Study on Diluted Sulfuric Acid Treatment of Low Calcium Efflorescent Coal to Improve the Humic Acid Productivity"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 pp 29-32

ABSTRACT: With the development of humic acid type fertilizers in China in recent years, many organizations have used the technique of raising the humic acid content of the raw material coal [peat?] as the basis for improving the quality of the products. Many methods, including treatment with nitric acid or hydrochloric acid, etc. have been tried, but due to the fact that the cost of nitric acid, etc. is high there has been no way to extend these methods. Industrial waste sulfuric acid is plentiful, however. An experiment is, therefore, designed to use waste sulfuric acid of a density of about 20 percent to treat low calcium efflorescent coal and a result of 30 percent increase of the humic acid productivity is obtained. In an expanded experiment in cooperation with Yichun Compost Fertilizer Plant of Jiangxi Province, the humic acid content of the products is greater than 60 percent, the water solubility greater than 50 percent, and fast nitrogen [illegible] than 5 percent. The experimental data and procedure are reported.

AUTHOR: LI Lijiong [2621 7871 3518]

ORG: Dongfeng Chemical Fertilizer Plant, Shandong Province

TITLE: "Industrial Application of Propylene Carbonate Decarbonization"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 pp 43-49

ABSTRACT: Using propylene carbonate (P.C.) as a solvent to remove carbon dioxide from mixed gas is a new technique in the process of being developed. The technique has the general merit of low energy consumption of the physical absorption process, and is stable, poisonless, noncorroding, and low volatile. After a small experiment of $13\ kg/cm^2$ was successfully completed, the Dongfeng Chemical Fertilizer Plant officially adopted it in Oct 78. The 8 months of test operation revealed that after using P.C. instead of washing with water, more than 200 kw of electricity was saved per ton of ammonia manufactured, the capacity of the absorption column was more than doubled, raw material gasification loss was cut into half, the purity and reclamation rate of CO_2 was high, and the cost of treatment was 45 percent lower. The equipment installation of the industrial application of the P.C. decarbonization process and the loss and production condition are introduced.

AUTHOR: CHEN Wuzheng [7115 0523 2973]

ORG: Nanhua Company Research Academy

TITLE: "Progress in Industrial Catalysts for Ammonia Synthesis"

SOUCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 pp 58-66

ABSTRACT: This paper discusses briefly the progress in catalysts used in ammonia synthesis industry in increased varieties and improved quality in the past 60 plus years since synthesized ammonia was first created. The improvements are especially important in the fact that the equipment used for ammonia synthesis may thus be serialized and expanded. Several major catalysts used by the ammonia synthesis industry are separately assessed, with emphasis on the new results of research on producing catalysts for China's large scale ammonia synthesis plants since the National Chemical Fertilizer Catalysts Work Conference in 1979. Finally, future developmental prospects in these catalysts are estimated, and certain short term goals and intermediate and long term developmental directions are suggested.

AUTHOR: None

ORG: Southwest Research Academy of Chemical Industry, Ministry of Chemical Industry

TITLE: "Research on Two-Step Transformer Gap Portion Heat Resistant Catalyst Z-204H Has Succeeded"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 p 73

ABSTRACT: Two different catalysts are generally used in the 2-stage transformers used in large ammonia plants introduced to China from foreign countries. The C_{14-1} heat resistant catalyst is filled in the upper level and the $C_{11-9-02}$ catalyst is used to fill the lower level. First of all, the upper catalyst has a chemical temperature reduction action to reduce the temperature of the gas from 1250°C to 1100°C after passing through this level of heat resistant catalyst which also resist the flushing capacity of the gas current to insure even distribution. For this reason, the upper level catalyst is beneficial as well as necessary. Several years ago, the Z-204 catalyst, similar to the $C_{11-2-01}$ made in the USA was successfully made by the academy. More than a year's use has proved it to be of good quality. The academy again successfully made the Z-204H which can be used to replace the C_{14-1} made in the USA. Z-204 and Z-204H now may be used in coordination to meet the needs of large scale ammonia synthesis plants.

AUTHOR: XU Chuanjiang [1776 0278 3068]

ORG: Shanghai Nanhui Chemical Fertilizer Plant

TITLE: "Application of Far Infrared Paint in the Electrical Heater of the Ammonia Synthesis Tower"

SOURCE: Shanghai HUAFEI GONGYE [CHEMICAL FERTILIZER INDUSTRY] in Chinese No 3, Jun 80 p 77

ABSTRACT: The Nanhui Chemical Fertilizer Plant began to use the new technique of far infrared heating, last year, in the electrical ovens. A good result has been obtained. During the major overhaul of equipment last year, the author and colleagues applied far infrared paint on the electrical heater of the synthesis tower and very obvious results of reduced consumption of catalytic agents, better temperature conditions, and lower consumption of power were obtained. The procedure and method of applying the paint are described. The paint should be dried under a temperature of 850-900°C. Due to lack of time, the author and colleagues assumed that the paint will solidify in the process of use and did not heat-dry it. The layer of paint has begun to peel. It will be examined, mended, and studied during next overhaul.

CSO: 4009

AUTHOR: ZHANG Xu [1728 3563]

ORG: Southwest Institute of Applied Magnetism, Mianyang

TITLE: "Some Advances in Applied Magnetism"

SOURCE: Beijing DIANZI KEXUE JISHU [ELECTRONIC SCIENCE AND TECHNOLOGY] in Chinese No 6, 80 pp 2-4, 36

ABSTRACT: Although magnetic materials and devices are extensively applied in industry, agriculture, scientific research, and medicine, applied magnetism has become an independent technology no more than one to two decades. Now every year, an international conference of applied magnetism convenes to discuss this ever growing field of very complex contents. This paper introduces new advances in magnetic bubble technology, magnetic recording technology, permanent magnetic materials, microwave iron oxides, noncrystalline magnetic materials, magnetic separation technology. Products and techniques mentioned in the paper are either of unnamed origin , or a corporation of USA, or Japan. There is no mention of progress in applied magnetism in China.

AUTHOR: GUO Yuncheng [6751 0336 8508]
LIU Yanbiao [0491 1750 2871]

ORG: None

TITLE: "Time-Domain Reflectometer Technology"

SOURCE: Beijing DIANZI KEXUE JISHU [ELECTRONIC SCIENCE AND TECHNOLOGY] in Chinese No 6, 80 pp 5-9

ABSTRACT: This paper introduces the basic theory of TDR and samples of application of simple TDR systems. The more complex TDR systems, such as the narrow band time-domain reflectometer NBTDR, which is not sufficiently precise and has not been extensively developed, and the automatic time-domain reflectometer TDANA which is currently being developed, are briefly mentioned.

AUTHOR: GU Bochun [7357 2672 2504]
ZHANG Yonggang [1728 3057 0474]

ORG: None

TITLE: "Research on Far Ultraviolet Exposure Technology"

SOURCE: Beijing DIANZI KEXUE JISHU [ELECTRONIC SCIENCE AND TECHNOLOGY] in Chinese No 6, 80 pp 15-16, 39

ABSTRACT: This paper reports a study on the light source required for far ultraviolet exposure technology, and the needed light filter, shield, and photoetching film. These materials should have good spectral property within the scope of 2000-3000 Å wavelength. These materials are all made in China. At present, the experiment has successfully reproduced on a chromium plate figures with lines of a minimum size of 0.75 μm. When Xihua No 3 photoetching film is used, the exposure time is about 3 seconds. When polymethylacrylate is used as photoetching film, the exposure time is about 3 minutes. Hard contact method is adopted for exposure. The experimental method and the work condition are reported. The merits and shortcomings of far ultraviolet exposure technique are discussed.

AUTHOR: ZHAO Baojing [6392 0202 4842]
LU Minfeng [6424 3046 1496]

ORG: None

TITLE: "Introducing TTL Digital Integrated Circuit Products Made in China: (5) Medium Scale Registers"

SOURCE: Beijing DIANZI KEXUE JISHU [ELECTRONIC SCIENCE AND TECHNOLOGY] in China No 6, 80 pp 37-39

ABSTRACT: This paper describes the following products: (1) Four-lock storage trigger (T452); (2) Four D type trigger (T451); (3) 4 x 4 register pile (T459). The circuits and logic diagrams of the above integrated circuits are given. Names of manufacturers of these are not given.

AUTHOR: (1) ZHANG Cairui [1728 1725 3843]
(2) PENG Chuancai [1756 0278 2088]
(3) ZHANG Qinglin [1728 3237 7207]
ZHOU Si [0719 7475]

ORG: (1) ZHANG of State-Operated Liaoyuan Machine Plant; (2) None; (3) ZHANG, ZHOU of Tianjin Broadcasting Instrument and Material Plant

TITLE: "Work Procedures and Equipment"

SOURCE: Beijing DIANZI KEXUE JISHU [ELECTRONIC SCIENCE AND TECHNOLOGY] in Chinese No 6, 80 pp 40-43

ABSTRACT: Three papers are included in this column: (1) Review of printed circuit photographic process: Photographic plate making is the key work process in printed circuit manufacturing. The appearance of computer controlled graph generator in the 70's was a great leap forward; domestically the scanning photographic technique has also begun to be applied in recent years. Three photograhic techniques are compared for quality, economy, etc. (2) Effective measures for improving reliability of thermal compression welding: Two measures, using beryllium oxide capillary to improve capillary temperature and plasma washing technique are discussed; (3) Constant temperature electric solder iron: After repeated experimentation, the authors made an electric soldering iron with a magnetic switch inside to maintain a constant temperature. The Tianjin Broadcasting Instrument and Material Plant is about to produce this 50W soldering iron in large quantities and will be prepared to export it.

6168
CSO: 4009

AUTHOR: YI Mingguang [2496 2494 6900]
DING Yunling [0002 7301 6376]

ORG: None

TITLE: " Common Single-unit Circuits in Integrated Operational Amplifier"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 8, Aug 80 pp 18-2

ABSTRACT: Although there are now many types of integrated operational amplifiers to meet different types of needs, their internal circuits have many common characteristics. An understanding of these individual circuits that are common in most integrated operational amplifiers can help establish a foundation for analyzing and understanding the various integrated operation amplifiers. This paper introduces the following individual circuits: (1) Differential input circuit; (2) Constant current source; (3) Conversion circuit to change dual-terminal to single terminal; (4) Active negative load amplifier; (5) Direct current potential shift circuit; (6) Output stage circuit.

AUTHOR: LU Yiming [7627 1355 7686]
SU Guisheng [5685 2710 3932]

ORG: None

TITLE: "Deionized Water Quality Automatic Tester"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 8, Aug 80 p 24

ABSTRACT: In the process of producing semiconductors, the size of the resistance rate of the deionized water can directly affect the quality of the products. This paper describes an instrument made by the author which will send a signal automatically when a large quantity of deionized water is being used and when the resistance rate of the water is lower than the required standard. The circuit design and the process of making the instrument are reported.

AUTHOR: XIAO Jun [2556 1498]

ORG: None

TITLE: "Selection of Fixed Capacitor for Transistor Radio Receivers"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 8, Aug 80 pp 30-31

ABSTRACT: There are many types of fixed capacitors that can be used in transistor radio receivers. The various types have different capacities to make it difficult for a beginner to decide which one to choose to meet his needs. Based upon the function of the fixed capacitors in a radio, five types may be needed. The properties of major types of fixed capacitors are explained to enable the reader to match his needs with the properties of the capacitors.

6168
CSO: 4009

AUTHOR: HU Rushun [5170 3067 5293]

ORG: Shanghai Boiler Works

TITLE: "Discussion of Flaw Location for Ultrasonic Inspection of Curved Surfaces"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 1-9

TEXT OF ENGLISH ABSTRACT: The paper presents a calculating method applied to the ultrasonic inspection of curved surfaces with angle probes. The location of a flaw can be determined directly from the screen since a flaw-locating rule is used. In addition, the following points are discussed via analysis of error: 1) the calculation for the allowable maximum K-value (tangent of the reflecting angle); 2) method for measuring the incidence point and K-values of the probe when the curvature radius of a workpiece is relatively small; 3) the range in which the locating method and the flaw-locating rule have to be used.

AUTHOR: GU Jueqi [7357 3778 3825]
WANG Fengxiang [3769 7364 4382]
CUI Longjun [1508 7127 0193]
et al

ORG: None

TITLE: "Study on Ultrasonic Probes Made of Lithium Iodate, Lithium Sulfate and Lithium Niobate Crystals"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 10-15

TEXT OF ENGLISH ABSTRACT: This paper discusses the manufacture of the focused probes for immersion application and time-delayed probes both with narrow pulse and made of $Li_2SO_4 \cdot H_2O$, α-$LiIO_3$ crystals. It also describes the manufacture of the highly sensitive normal probes made of $LiNbO_3$. The preliminary test results show that the probes are good in performance when used in the ultrasonic thickness gauge Type SCH-I and Type SCH-II.

AUTHOR: YAO Zhizhong [1202 1807 1813]

ORG: Wuhu Shipyard

TITLE: "The Application of the Thin-Plate Test Block to Ultrasonic Inspection of Welds in Medium and Thin Steel Plates"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 16-22

TEXT OF ENGLISH ABSTRACT: This paper describes the principle and methods of application of the thin-plate test block in determining locations and relative dimensions of defects in welds of medium and thin steel plates by the ultrasonic method, and the methods to measure the three parameters of an angle probe. It analyzes and compares the errors in the determination of locations of defects. The characteristics in the application of the equivalent size method are presented.

AUTHOR: JIANG Weizhi [1203 0251 0037]

ORG: Beijing Institute of Aeronautics and Astronautics

TITLE: "A Preliminary Attempt to Express the Brittleness of Nitrided Layer --An Application of the A.E. Technique"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 23-28

TEXT OF ENGLISH ABSTRACT: It is suggested in this paper that the limiting plastic strain which a nitrided layer can undergo is a criterion for the crack initiation, so an approximate strain analysis is made for a nitrided bend sample, and a parameter $2(m + 2)\frac{\Delta_{PC} \cdot h}{S^2}$ is obtained, which may be used to characterize the brittleness of the nitrided layer measured by the A.E. technique. Using this parameter it is possible to provide an assessment basis for selecting and developing new nitriding techniques. This attempt is confirmed initially by the A.E. experiment on four nitriding steels. Within the scope of the ionic nitriding technique studied here, the sequence of the above-mentioned steels arranged according to the increasing brittleness of the nitrided layer is as follows: 40Cr, 20CrMnTi, 35CrMnSi, 38CrMoAl.

AUTHOR: CHEN Jinean [7115 6930 3503]

ORG: Wuhan Institute of Physics, Chinese Academy of Sciences

TITLE: "Thermoplastic Imaging and Its Application to Ultrasonic Holography"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 29-31

TEXT OF ENGLISH ABSTRACT: This paper describes the principle of thermoplastic imaging, and gives the results of recording and optically reconstructing the ultrasonic holograms by means of transformation of optical conductive imaging and transmission of video signals directly from the ultrasonic holographic system to the thermoplastic light valve. It is shown that thermoplastic imaging can be used for real-time reconstruction of an acoustic hologram. Its practical application to NDT in the future is discussed.

AUTHOR: CAI Hongchi [5591 7703 3069]

ORG: Beijing Iron and Steel Research Institute

TITLE: "Melting Point Method for Quality Inspection of Brazing"

SOURCE: Shanghai WUSUN JIANCE [NON-DESTRUCTIVE TESTING] in Chinese No 1, Feb 80 pp 32-33

TEXT OF ENGLISH ABSTRACT: This paper presents the melting point method for quality inspection of brazing of stainless steel belts on blades. The components of the paint are given, and the test results show that the quality of the brazed blades can be reliably detected.

9717
CSO: 4009

Engineering

AUTHORS: SUN Yiping [1327 4448 1627], CHEN Qing [7115 7230]

ORG: Institute of Construction Machinery, State Construction Committee

TITLE: "Research on Improving the Life of Mixer Blades in Forced-Action Cement Mixers"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 1-7

ABSTRACT: A weak point of forced-action cement mixers was short blade life (2,000-4,000 loads). Investigation of the factors governing lifetime led to a focus on blade composition and shape. Tungsten-alloyed cold cast irons were chosen as the most promising material. It was determined that a relatively hard matrix containing evenly-distributed, separate carbide particles was most resistant to the scraping wear involved. Tests of different tungsten alloys revealed that a composition of 15-18 percent tungsten produced a combination of the desired features. Tests of blades made with this alloy gave an average life of 11,370 loads. Because failure often resulted from breakage or upper edge wear, the shape of the blade was changed from a curved shape of variable thickness, subject to strains, to a flat blade of even thickness. The blade angle was changed from 45° to 5°. The result was an average blade life of 14,153 loads.

AUTHORS: FU Bingliang [0265 3521 5328], ZOU Fuqing [6760 4395 1987]

ORG: None

TITLE: "Experimental Development of a Torsional Vibration Damper"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 8-12

ABSTRACT: The drive train of the CL-7 scraper was subject to extreme vibration, resulting in drive shaft twistoff and damage to the vibration damper, when starting or stopping and while idling. Tests determined that there was a resonance between 400 and 460 rpm. It was decided to change the system's stiffness to move the resonant frequency out of the range of engine speeds. A vibration damper of reduced stiffness (12.32 rather than 34.8) gave much lower peak loads on starting and when idling (76 compared with over 200 kgm and 86 compared with 200 kgm) but could only transmit a torque of 72 kgm (compared with 92 for the original). A new design with a stiffness of 61.1 using a steel-powder metallurgical material rather than steel-phenol formaldehyde had a slightly higher stopping and starting torque (96 kgm) but a lower idling torque (40 kgm) and was capable of transmitting 175 kgm of torque. This device proced to have a lifetime 80 times that of the reduced stiffness vibration damper.

AUTHOR: None

ORG: Shaoxing Engineering Machinery Plant

TITLE: "Brief Introduction to a Half-Ton Loader"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 p 12

BASTRACT: The Dongfanghong 24Z half-ton loader is based on the Dongfanghong 24Z tractor. The bucket capacity is 0.25 m^3, with a rated load capacity of 0.5 tons. It can lift to 2.46 meters and clear a height of 1.76 m when dumping. The lifting mechanism is powered by two hydraulic cylinders rated at 4.4 tons each and the dumping mechanism by two cylinders rated at 3.5 tons each. The bucket can be lifted to full height in 18 seconds.

AUTHOR: HU Pengcheng [5170 7720 4453]

ORG: None

TITLE: "The MSZ-3 Volumetric Efficiency Indicator"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 13-14

ABSTRACT: The MSZ-3 volumetric efficiency indicator, which is used to measure the efficiency of hydraulic equipment, is an improvement on the 1974 SZ-3A digital volumetric efficiency indicator which makes use of integrated circuit technology. Its method of computing volumetric efficiency is altered: it measures the number N of rotations of the pump necessary to produce a certain flow volume Q_0, after which it determines the flow volume under load Q_1 produced in N rotations. If Q_0 is 1,000, then Q_1 gives the volumetric efficiency as a percentage. The device can also be used to determine the output of hydraulic pumps and to determine the ratio of two rotary speeds.

AUTHOR: LU Shoupeng [4151 1108 1756]

ORG: None

TITLE: "Productivity of Bucket Wheel Excavators"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 19-24

ABSTRACT: There are three different ways of figuring the productivity of bucket wheel excavators. The "theoretical productivity" is based only on bucket capacity and unloading speed under ideal conditions. The "technical productivity" takes account of actual working conditions involving different types of material to be excavated, incomplete filling of the bucket and the like. The "actual productivity" is simply the ratio of actual number of cubic meters loaded to time elapsed. Improved methods of allowing for bucket capacity are discussed and figures for various Soviet and European models given. The ratio of the theoretical to the actual productivity is discussed. Methods of determining the capacity of a belt conveyor to be used with the excavator are discussed and some figures for Japanese, Soviet and European models given.

AUTHOR: None

ORG: Tianjin Institute of Engineering Machinery, First Ministry of Machine Building; Yichun Engineering Machinery Works

TITLE: "The ZL-30 Loader"

SOURCE: Beijing GONGCHENG JIXIE [EINGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 25-29

ABSTRACT: The ZL-30 loader was developed in 1977-1978 by the Tianjin Institute of Engineering Machinery and the Yichun Engineering Machinery Works. It can be used in municipal construction, small-scale water engineering projects, agricultural construction and the like. It is usable with 4-8 ton trucks. The rated load capacity is 3 tons and the rated bucket capacity 1.5 m^3. Its maximum forward speed is 34 km/hr in second gear. The rated power is 94 HP and the device weight 10.06 tons. Diagrams of the hydraulic torque converter, transmission, drive axle, working hydraulic system, steering system and brake system are provided along with brief descriptions.

AUTHOR: LIN Jianya [2651 1696 0068]

ORG: Zhejiang University

TITLE: "Optimal Impeller Wheel Blade Output Angles for a Single-Stage Hydraulic Torque Converter"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 30-36

ABSTRACT: A single-variable model is used to compute the optimal impeller blade output angle for a hydraulic torque converter under rated operating conditions. The accuracy of the resulting equations is tested by using in them the parameters of 11 different torque converters (US, Soviet and other countries) for which optimal values can be assumed to have been found empirically. With optimal angles ranging from 35° to 109.5°, the calculated results never differ by more than 5°. Part of the discrepancy results from the fact that the calculated values are fluid flow angles and not blade angles.

AUTHOR: ZHOU Jiarui [0719 1367 3843]

ORG: Wuhan Engineering Machinery Plant

TITLE: "Analysis of the Assembly of the 3K Planetary Hoist and Machining of the Main Components"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 43-46

ABSTRACT: The essential parameters of the 5-ton model 3K planetary hoist are described. Machining involves three main components. In the case of the planetary gears, for ease of assembly it is required that the axis of symmetry of one gear valley be in the same plane as that of the key slot. The positions of the key slot and the gear valley are fundamental in positioning for machining. The machining of the frame and driveshaft assembly and the central gear is also described.

AUTHOR: HUANG Bingjiang [7806 4426 3068]

ORG: Guangdong Provincial Building Materials Machinery Plant

TITLE: "Flame Quenching of the Surface of an Inset Track in the Rotating Mechanism of a Tower Crane"

SOURCE: Beijing GONGCHENG JIXIE [EINGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 46-51

ABSTRACT: Flame quenching of the inset ball bearing race of the rotating meachnism of a tower crane is intended to produce a Rockwell C hardness of 50-55 for a depth of 2-3 mm. The surface is heated with an oxyacetylene torch to 900-930° C, air cooled to 830-860° over 7 seconds, then cooled with compressed air to 730-760° over an additional 7 seconds, after which it is water cooled. The optimal size of the flame, air and water jets is discussed and a design with all the jets integrated into a single head is described. The process is found to produce a hardness (HRC) of 56-52 in a 3 mm quench layer in 40 Cr steel, with a hardness of 48-27 in the transitional layer and a Brinell hardness of 179-194 in the interior. Photomicrographs of relevant metal sections are presented.

AUTHOR: LI Yingkai [2621 2503 0418]

ORG: Fushun Eacavator Plant

TITLE: "Introduction to an Automatic Hydraulic Large Gear Quenching Machine"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 p 50

ABSTRACT: Discarded parts were used in constructing a device for quenching of the teeth of large gears. The hydraulic device is automatically controlled. It can handle gears measuring 800-2000 mm in diameter and treat gear teeth measuring up to 500 mm. The heater can operate continuously for up to 3 minutes. The positioning is done manually.

AUTHOR: JIANG Xinnian [1203 2450 1628]

ORG: Huadong Construction Machinery Plant

TITLE: "Applications of Sealants in Engineering Machinery"

SOURCE: Beijing GONGCHENG JIXIE [EINGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 52-54

ABSTRACT: A major area of application of sealants is in the prevention of oil and fluid losses in construction machinery. New liquid high molecular weight compounds or "liquid gaskets" can be painted onto contacting curfaces and while remaining liquid can prevent oil leakage. In addition, they can easily even out irregularities in the contacting surfaces. So-called "anerobic adhesives" based on acrylic esters can set in the absence of air and are particularly useful in threaded connections. The brake belts of the JY-13 3 m^3 cement mixing vehicle use polyurethane adhesive to bond the friction belt to a metal base. Some problems involved with liquid sealants are: extending the usable temperature range, performance on surfaces of various shapes, and pressure requirements for sealing surfaces. A list of Chinese-produced liquid and anerobic sealants is given.

AUTHOR: WANG Kehuan [3769 0668 1403]

ORG: Beijing Research Institute of Coal Science

TITLE: "A 'Hard Facing-Welding' Method Combining Cemented Facing Material and Tubular Welding Rods Used with an Oxyacetylene Torch"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 55-56

ABSTRACT: Hard facing with such materials as tungsten carbide is a useful technique which has long been in use. But the thickness of the applied surface is limited to approximately the size of tungsten carbide grains. If an attempt is made to produce a thicker surface, it will either have insufficient bonding strength so that the outer layers will crack off or the heat applied will cause the crystals in the inner to sink into the metal being hardened. A method is described in which a base layer of carbide grains is cemented on with water glass or a similar material, then heated until the crystals sink partially into the metal surface, after which an oxyacetylene torch is used to apply an additional layer of carbide using tubular welding rod. The method has been used to face mining drill bits, which have shown more than 5 times the durability of ordinary bits.

AUTHOR: LIU Fangyu [0491 5364 1342]

ORG: None

TITLE: "Improvements in the Hydraulic System of the Z425 Loader"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 pp 58-60

ABSTRACT: The Z425 wheeled loader showed a tendency to engine overload and overheating of the coolant and the hydraulic fluid. The reasons were incorrect selection of hydraulic system parameters and excessive fluid leakage. The CB46 gear pump had a much higher output than was needed by the hydraulic transmission and steering system even at peak load. This caused excessive leakage, and the excessive flows resulted in overheating and decreased viscosity of the hydraulic fluid. A changeover to use of the YBC-12/80 pump in the transmission hydraulic system and the YBC-30/80 pump in the steering system resulted in much lower, but still adequate, flow volume, largely solving the problem. Power consumption of the two hydraulic systems was reduced from 20.4 HP (21 percent of engine power) to 5.67 HP (6 percent of engine power). Performance tables are given.

AUTHORS: LI Defa [2621 1795 4099], BAI Bingying [4101 3521 5391]

ORG: Loading and Unloading Machinery Repair Plant, Xi'an Municipal Transport Company

TITLE: "Improvements in the Operating Structures of the High-Low Speed Selector and Rear Axle Disengage Mechanism of the Z425 Loader"

ABSTRACT: Both the high-low speed selector and the rear axle disengage mechanism of the Z425 loader used mechanical linkages which were operated by levers with a large travel distance. These were mounted on opposite sides of the cabin and were difficult to operate and got in the driver's way. Both devices were replaced by pneumatic linkages operated by simple slide valves, thus simplifying operation and making the cab layout more convenient.

AUTHOR: WENG Yunshu [5040 0061 2562]

ORG: Puyuan Engineering Machinery Plant

TITLE: "A Three-Ton Rail-Mounted Forging Handling Device"

SOURCE: Beijing GONGCHENG JIXIE [ENGINEERING MACHINERY] in Chinese No 7, Jul 80 p 62

ABSTRACT: The Puyuan Engineering Machinery Plant has developed a three-ton track-mounted forgings handling device. It consists of six main assemblies: the main carriage assembly, the front lifting mechanism, the rear lifting mechanism, the grasping head rotating mechanism, the carriage rotating mechanism and the grasping head close mechanism (hydraulically operated). The grasping head can hold blanks with a diameter of 100-550 mm and can move 5° upwards and 8° downward. The track is 2200 mm long, the dimensions are 5.67 x 2.8 x 3.23 m, and the device weighs 20 tons.

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CSO: 4009

AUTHOR: ZHAO Hongshou [6392 4767 1558]

ORG: None

TITLE: "Yazuishou of Sciences--Metascience"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 3, Mar 80 pp 1-3

ABSTRACT: There is a mammal called Yashishou [Ornithorhynchus anatinus] having a mouth looking like the beak of a duck, yet it does not lay eggs. It is viviparous and is a transitional creature between a reptile and a mammal. There is also such a thing among sciences. The author refers to metascience, which, he claims, is like a natural science, using computation, simulation, model building, experimentation, and statistical analysis as its methods. It looks upon sciences as a social phenomenon, however. It assumes a position between natural and social sciences and is, simply speaking, a field of inquiry into the structure and development of science itself. The paper traces the origin and development of metascience from the end of the 18th Century, through the 19th Century, to the various related international discussion meetings, 1975-1977, held in Germany, France, or Poland. The bulk of the paper deals, in a haphazard way, the contents of metascience, while the fact that it is being criticized as merely a new version of the old natural philosophy of the 19th Century is also casually mentioned.

AUTHOR: LU Qi [7627 [illegible]]

ORG: None

TITLE: "An Underground Palace of Wood in a Giant Scale--the Han Tomb of Dabaotai"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 3, Mar 80 pp 7-9

ABSTRACT: Dabaotai Han Tomb is the resting place of King Yan, LIU Dan [0491 2481] a member of the royal family (117-80 B.C.) The excavation of his burial chamber was carried out Aug 74 to Jun 75. It was revealed to be a giant complex, measuring 23.2 x 18 x 3.7 m, beneath a soil cover of 9-10 m in thickness. Although grave robbers obviously visited earlier, nearly 400 items of pottery, brass, iron, jade, agate, and silk artifacts were found. The iron articles were identified by Beijing College of Iron and Steel as being forged from steel produced from pig iron through a solid state decarbonation process, and were not heat processed cast iron. These may be said to be the oldest steel items discovered so far. The previous estimate for the invention of this steel-making technique must now be moved backward 3-5 centuries to the beginning of the first century B.C. the latest. The excavated tomb will soon be open to tourists, foreign and domestic. It is in the Fengtai District of Beijing, just to the north of the Beijing-Guangzhou Railway line.

6168
CSO: 4009

AUTHORS: SUN Shoucheng [1327 1108 2052], QIN Chengchang [4440 2110 2490]

ORG: None

TITLE: "The Intensity of the Liyang Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 1-4

ABSTRACT: Earthquakes occurred in Liyang on 22 April 1974 and 9 July 1979, with magnitudes of 5.5 and 6.0 respectively. Comparison of the lines of equal intensity for the two earthquakes show remarkable similarities as regards location of the epicenter and shape and size of the areas of various intensity levels. The patterns are related to geological and physiographic features. Four faults in the area played a particularly important role, but of especial importance in determining local intensities was the nature of the terrain, which was divided into three different types: exposed bedrock, marshy terrain, and an intermediate hilly and ridged terrain of relatively hard sandy and clayey soil. Damage was much greater in the marshy area than on the ridges.

AUTHORS: WU Zhenlin [0702 2182 2651], ZHANG Jinbo [1728 6930 3134],
ZOU Quansheng [6760 2164 3932], TONG Wu [0157 2976]

ORG: None

TITLE: "An Analysis of the Dynamics of Water Levels in Deep Wells"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 4-6

ABSTRACT: The question of water levels in deep wells is attracting attention as an earthquake prediction feature. However, some other perturbing factors must be taken into account in order to make the measurements meaningful. These include earth tides, air pressure, and precipitation. A sliding-average method is proposed for dealing with the contribution of earth tides. A regression formula relating air pressure to water level is presented. When graphs of actual water levels in the Xingyi well are compared with an expected normal range (whose actual values vary over the year), there are several striking instances of coincidence of abnormally low values in the period 1975-1978 with major earthquakes.

AUTHOR: Analysis and Prediction Laboratory, Hebei Provincial Seismology Office

ORG: None

TITLE: "A False Anomaly in the Horizontal Base Line on Red Mountain"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 7-8

ABSTRACT: In August and September 1977 there was a drop of 3 millimeters in the altitude of a peak on the Red Mountain Earthquake Station's short horizontal baseline. This proved not to be the result of geologic deformation. It resulted from two factors: uneven heat deformation of the two markers, and interference from underground water. The heat deformation factor proved to be cyclic over the year. The effect of underground water was taken into account by building a new baseline in which the southern marker was two concentric tubes, the outer serving as a casing and the inner attached only to the base-level rock. Markings on the inside of the casing made it possible to determine corrections to be made in the data.

AUTHOR: SU Luansheng [5685 7762 5116]

ORG: None

TITLE: "Annual Changes in Electrical Resistivity"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 9-11

ABSTRACT: Annual changes in electrical resistivity must be allowed for in assessing the results from observation stations. Some of these changes result from the observation system itself, being produced by changes in electrical insulation values, relative humidity of the air, electrical leakage and the like. Changes resulting from geological factors are produced by variations in ground temperature, and the movement and degree of mineralization of subsurface water, among other factors. The importance of these factors depends on the nature and depth of burial of the rock strata at the measuring station. Suggestions for siting of stations and overcoming the disadvantages of poor sites are given.

AUTHOR: MENG Fanxi [1322 4907 0823]

ORG: None

TITLE: "Brief Introduction to the SZ-2 Quartz Digital Clock"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 11-12

ABSTRACT: The SZ-2 auartz digital clock uses MOSFET integrated circuit technology, has very low power consumption and has a daily error of less than 0.5 second. It has a time-set circuit to allow setting in terms of a broadcast time signal. The output time signals range from days to thousandths of a second; there are various coded time outputs and a 50 Hz square wave signal. A circuit diagram is given.

AUTHOR: Water Chemistry Group, Analytical Laboratory, Hebei Provincial Seismological Office

ORG: None

TITLE: "Lessons of a False Alarm"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 13-15

ABSTRACT: On 6 April 1978 the Water Chemistry Group noticed elevated radon levels in water from the Wenan well, on the basis of which they predicted an earthquake of magnitude 5-6 or greater; the earthquake did not occur. Analysis of reasons for the false alarm indicated that this well showed an annual variation in radon levels, within which the observed level was normal. The radon level was found to be inversely related to the water level; in the first half year heavy irrigation lowered the water level, thus raising the radon level. The trend reversed in the second half year (with an exception during the September-October irrigation period), with the water level rising and the radon level decreasing.

AUTHOR: ZHOU Taiping [0719 1132 1627]

ORG: None

TITLE: "A Pocket Superlow-Frequency Signal Generator"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 15-16, 48

ABSTRACT: This device, designed for maintenance of earthquake equipment and field earthquake detection work, is a regenerative oscillator based on a BG301 operational amplifier. It has outputs of 1, 5, 10, 20 and 50 Hz, with either a one-sided undamped 6-volt signal or a symmetrical signal with a damping constant of 2/10000; the output resistance is 500 ohms, the waveform nonlinearity distortion coefficient is no greater than 3 percent, and the device uses 5 mA at 9 volts. The circuit equations are analyzed and the equivalent circuit presented.

AUTHOR: JIANG Zhong [1203 1813]

ORG: None

TITLE: "Information on the Guandun Magnitude 6 Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 17-18

ABSTRACT: At 2033 hours on 18 May 1978 an earthquake of magnitude 6.0 occurred in Guandun Commune, Yingkou county, Liaoning. It was an aftershock of the magnitude 7.3 Haicheng earthquake. Application of the Gutenberg logarithmic formula relating number and magnitude of shocks to the data between 1 July 1975 and the end of April 1978 indicated that no earthquake above magnitude 5 would occur. However, the short-term average magnitude of earthquakes had fallen well below the long-term average magnitude, indicating that a large earthquake was to be expected. Moreover the rate of energy release had also fallen below the long-term average by an amount equivalent to at least a magnitude of 4.5.

AUTHORS: TANG Rongchang [0781 2837 2490], LI Tianshao [2621 1131 4801]

ORG: None

TITLE: "The Dangxiong Earthquake of 1952"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 18-20

ABSTRACT: Earthquakes of magnitudes 8 and 7.5 occurred on 18 November 1951 and 18 August 1952 respectively in the Dangxiong region, Tibet. The article presents information on the latter earthquake. The intensity at the epicenter was 10, and the focus was 27 kilometers deep. The average attenuation along the long axis was 3.5 and along the short axis 6. The quake was located on the intersection of the Nuoqu-Dangxiong fault (running NE) with a group of east-west faults. The activity of these faults is shows by the existence of large numbers of hot springs along them, terrain deformations on opposite sides, the presence of fault subsidence basins and previous earthquake records. The shape of the earthquake area was governed primarily by the Nuoqu-Danxiong fault and the Jiuzila fault (WNW). Some hypotheses concerning the nature of the 1951 earthquake, for which data are scarce, are offered.

AUTHOR: ZHAO Chengda [6392 2052 6671]

ORG: None

TITLE: "Electrical Resistivity Anomalies in the Aftershocks of the Tangshan Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [EARTHQUAKE FRONT] in Chinese No 1, 1980 pp 21-22

ABSTRACT: The size (magnitude and duration) of resistivity anomalies measured at several stations in the vicinity of Tangshan was related to the occurrence of aftershocks of the magnitude 7.8 earthquake. It was found that the magnitudes of the anomalies before aftershocks of magnitudes 6.9 and 6.2 were much smaller than in the case of main earthquakes of the same magnitudes. When three aftershocks were considered in time sequence, the ratio of anomaly duration to shock magnitude increased over time: anomaly duration increased and shock magnitudes decreased. The aftershocks tended to be associated with a change of direction in the anomaly curve. Little work has been done on the relation between anomalies and aftershocks. The main difference seems to be that the anomalies are smaller for aftershocks than for main quakes; this may be because an energy release process is involved rather than an energy accumulation process as in the case of main earthquakes.

AUTHOR: Laboratory No 2, Prediction and Analysis Center, National Seismological Office

ORG: None

TITLE: "Earthquakes in 1979"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 22, 24

ABSTRACT: A table listing 18 earthquakes of magnitude 7 or greater throughout the world in 1979 is presented, along with a table listing 24 earthquakes in China of magnitude 5 or above. Of these, 19 were of magnitude 5-5.9 and 5 were of magnitude 6-6.9; earthquake activity was slightly higher than in 1978. Maps of earthquake distribution worldwide and in China are given.

AUTHOR: ZHANG Yong [1728 1661]

ORG: None

TITLE: "The Tonghua Magnitude 1.0 Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 23-24

ABSTRACT: On 31 August 1977 an earthquake of magnitude 1.0 was registered in Tonghua County, Jilin Province. The intensity was as high as 4 at the epicenter. Ground electricity anomalies had been observed in the vicinity 50 days before the earthquake. ERTS photographs show three faults in the vicinity of Tonghua whose interaction was probably responsible for the earthquake. Minor earthquakes in 1975 and 1978 were probably also related to these faults. The high intensity of the quake is probably accounted for by a shallow focus.

AUTHORS: NI Guilin [0242 2710 2651], ZHOU Guixiang [0719 2710 7449]

ORG: None

TITLE: "An Initial Analysis of the Relationship Between Drought Regions and Earthquakes"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 25-26

ABSTRACT: Rainfall records at 140 meteorological stations in Jiangsu, Shandong, Anhui and Zhejiang provinces between 1953 and 1978 were compared with records of earthquakes of magnitude 4.0 or greater in search of correlations. Of 27 earthquakes of magnitude 4.0 or above, 24 were in areas which were on the edge of a drought area in the previous year. In the case of the three earthquakes of magnitude 5.0 or above, all were in areas where the drought had covered at least 240,000 square kilometers and in which the rainfall deviated more than 40 percent from normal. A measure of drought severity (area times intensity) correlated well (r = 0.80) with the magnitude of the associated earthquake in the following year. In addition, for years whren this value was high, an earthquake of 4.0 or stronger followed in 16 of 21 cases; when the value was extremely high, the figure was 10 of 11 cases. Some earthquakes occurred in areas of good rainfall within drought regions. In 1978 a severe drought occurred in the four provinces, leading to a forecast of an earthquake of magnitude 5.5 or above; earthquakes of magnitudes 5.3 (2 March) and 6.0 (9 July) occurred in the following year.

AUTHOR: XIA Yiliang [1115 1355 3213]

ORG: None

TITLE: "A Table of Earth Magnetism Components"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 27-28, 31

ABSTRACT: When nuclear spin devices are used to determine the total strength of geomagnetism and the vertical component, calculation of the horizontal component is a time-consuming process. The principles for constructing tables that can be used to determine the components simply are described and the tables are constructed. An error analysis shows the error to be within acceptable limits.

AUTHOR: CHEN Weiting [7115 4850 1694]

ORG: None

TITLE: "Torsional Damage"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 29-31, inside back cover

ABSTRACT: Examples of torsional damage have occurred in many earthquakes. Explanations have been offered in terms of structural asymmetry, torsional movements of the earth's surface, and dislocations at the earthquake focus. Symmetrically-designed structures may have asymmetrically distributed facilities inside or a slight lean, or may be made asymmetrical by earthquake action (cracking and the like). Extremely complicated motions of the earth's surface have been observed, including "seiving" motions which could produce torsional damage. As to the effect of dislocations at the focus, one theory is that they can produce a torsional effect as a result of passage of the seismic wave through geological structures of different composition.

AUTHOR: HUANG Zhenping [7806 2182 1627]

ORG: None

TITLE: "Interference of Strong Vibrations with Ammeters"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 32-33

ABSTRACT: Strong vibrations can produce fluctuations in the output of ammeters used in earthquake research. The result of lateral movement on an Fc6-120 instrument is analyzed and found to be slight, although vibration damping is recommended. Torsional movement, however, can produce considerable fluctuations, which are illustrated for the Fc6-120 ammeter.

AUTHOR: Lu Qigu [7120 0366 7711]

ORG: None

TITLE: "Detection of Ultramicroseisms"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 33-34

ABSTRACT: Ultramicroseisms are shocks of magnitude +1 to -1; some devices can detect them as low as magnitude -2. These may in some cases precede a major earthquake, as in the case of the Liaonan quake; in other cases, such as Tangshan, they are absent. A logarithmic relationship between period and magnitude has been established, according to which vibrations of M = -1 are at frequencies of about 40 Hz, so that a good machine design would be sensitive to about 60 Hz. The authors' machine has a range of 8-60 Hz, with an amplification factor of 1-10 million. Ultramicroseismometers first came into use in China in 1971-72, and tests were made in the Beijing area in 1976. The devices are effective in detecting ultramicroseisms at ranges up to 100 km; at 200 km they have about the same detection capability as ordinary microseismographs, while above 200 km they are inferior to the latter.

AUTHOR: YIN Hannan [1438 3352 0589]

ORG: None

TITLE: "Water Radon Anomaly Fields"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 35-37

ABSTRACT: A striking aspect of water radon levels in relation to earthquakes is that before the Tangshan quake there was a remarkable synchronicity of behavior of many wells within 200 km of Tangshan. However, for many wells anomalous values persisted after the earthquake, particularly outside the immediate region of the quake. It is clear that radon may be produced by various processes; some candidates are pressure, shear, vibration, temperature and pressure, mixing of water-bearing strata, breakdown of mineral crystal structure, and the like, although it is not clear which of these are primary. It seems that a possible explanation of the persistence of the anomaly in the case of Tangshan may be that the earthquake released strain in the vicinity of Tangshan but increased it further along the geological structures involved, thus producing a continued radon buildup.

AUTHORS: Xu Xiao [6079 4801 2010], SHEN Peiwen [3088 1173 2429]

ORG: None

TITLE: "Earthquakes and Crustal Buckling"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 1, 1980 pp 38-40

ABSTRACT: Analysis of earthquakes between 1556 and the present indicates that earthquakes of magnitude 8 and above are usually accompanied by other earthquakes of magnitude 7 or 8 within 10 years, and that these second earthquakes of the pairs tend to be at distances of either 480-550 or 1100 kilometers from the earlier quakes. A clue to the cause is given by the fact that pairs of earthquakes of magnitudes 6-7 in 1966-1976 and pairs of magnitudes above 6.5 from 1800 to 1965 can be located on opposite sides of a strip running across China at a 45° angle to the meridian. Moreover the spacing of these pairs of quakes across the strip in question is such as to divide it into even segments. This pattern suggests an explanation of the pairing of earthquakes in terms of buckling of crustal plates under pressure. The overall pattern of earthquake zones on the globe suggests a similar explanation.

AUTHORS: Various

ORG: None

TITLE: "A Small Discussion of Electromagnetic Wave Anomalies Preceding Earthquakes"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in CHinese No 1, 1980 pp 41-43

ABSTRACT: Six brief pieces on various aspects of electromagnetic wave anomalies are presented. They cover: earthquake "electromagnetic emanations"; the use of "magnetic induction information" for earthquake forecasting; electromagnetic pulse emissions as pre-earthquake indicators; the use of magnetic sensors to determine medium-wavelength field strength for earthquake prediction purposes; magnetic deviation indicators inside reinforced-concrete buildings; and a discussion of the general physical principles involved.

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CSO: 4009

AUTHOR: WANG Guoqiang [3769 0948 1730]
LIU Yueyuan [0491 1471 0337]
CAO Meiliang [2580 2734 0081]
ZHOU Fengbin [0719 7364 2430]

ORG: None

TITLE: "Ducted Propeller with Simplified Duct Profile (continued 1.)"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 1-12

TEXT OF ENGLISH ABSTRACT: This paper includes the results of the open water tests of two systematic series of simplified ducted propeller models, i.e., JD75 + Ka 4-85 and JD7704 + Ka 4-85. The $J \sim K_T$, K_{TN}, K_Q and η_0 curves and the coefficients of the regression polynomials corresponding to these curves are given. The usual $\sqrt{B_p} \sim \delta$ diagrams are also appended.

AUTHOR: ZHANG Hongjun [1728 7703 6874]

ORG: None

TITLE: "Resistance Tests and Analysis of the Bulb-Bows for Single Screw Cargo Ship"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 13-31

TEXT OF ENGLISH ABSTRACT: The results of two model resistance tests for single screw cargo ships with a block coefficient of about 0.67, with and without bulb-bows, are analyzed. Through the resolution of model resistance components it is shown that the form resistance of this kind of ship is approximately the wave resistance in value. From this, the design of bulb-bows is put forward. According to the tests of about 30 kinds of bulb-bows under different loading conditions, a corresponding formula of boundary speed is induced which may be a criterion identifying the bulb-bow effect.

In this paper the influence of particular parameters on the bulb-bow effect is also analyzed, and the reference of selecting principal parameters of bulb-bows is given.

AUTHOR: SHU Changgeng [2631 7022 1649]

ORG: None

TITLE: "An Application of the Finite Element Analysis Method in the Vibration Analysis of Ship Grillage"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 32-44

TEXT OF ENGLISH ABSTRACT: Based on the general solution of differential equations for the transverse vibration of a beam and by means of the finite element method, two kinds of matrices for the vibration of beam elements, i.e., mixed matrix and stiffness matrix, are obtained and applied to the calculation of the free vibration of a ship grillage. Considering the common property of the mixed method and the displacement method, a unified method for solving the nonlinear eigenvalue problem of high order matrices with transcendent functions is presented. This method is very convenient and can avoid the loss of roots of the eigenvalue equation. By this method the difficulty in the lack of storage of the present computers for vibration analysis may be overcome.

A very close approximation between theory and experiments is shown in the calculated examples. Therefore, it may be considered that the present method is effective.

AUTHOR: ZHENG Hangyuan [6774 5887 6678]

ORG: None

TITLE: "A Theory of the Elastic Corner of a Hull Opening and Its Tests and Calculations"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 45-54

TEXT OF ENGLISH ABSTRACT: A theory of a new type of corner is presented in this paper. The author has named the new corner "elastic corner" temporarily. Through photoelastic tests and calculations of F.E.M., it is verified that the elastic corner can relax the severe strain part of the corner region and reduce the stress concentration coefficient. According to the results of tests and calculations, it is shown that the stress concentration coefficient of the elastic corner is about 15 percent less than that of the ellipse arc corner.

AUTHOR: SUN Yaohua [1327 5069 5478]

ORG: None

TITLE: "On Research and Tests of the Bending Shape Coefficient of Crankshafts"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 55-70

TEXT OF ENGLISH ABSTRACT: It is important to determine the coefficient of the crankshaft structure shape when calculating the diesel crankshaft strength, for it can strongly influence the accuracy of the calculated results.

On the basis of three-dimensional photoelastic stress measurement of many crank models made of epoxy resin, the bending shape coefficient of the crankshafts is researched and the satisfactory test results are also attained. These results are analyzed and compared with those of similar types at home and abroad.

By means of the mathematical method the test results are reduced to experimental formulas and curve diagrams which may be used to calculate the crankshaft strength.

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TITLE: "Reluctance Type Propeller Dynamometer (R.P.D.)"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 2, Apr 80 pp 71-88

TEXT OF ENGLISH ABSTRACT: The mechanical type propeller dynamometer is unable to satisfy the requirements of the automatic measurement for ship model tests. The R.P.D. is presented in this paper. In addition to the usual ship model test, it is possible to carry out test measurements for the underwater model and multi-propeller shaft model. The principle, structure and characteristics of the R.P.D. are described in this paper. In addition, the open water test data measured by the R.P.D. in the three towing tanks are compared with the results obtained by the mechanical type of dynamometer. It is shown that the performance of the R.P.D. is stable and reliable.

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